

					Phe-361 to Asp-367, Thr-436 to Arg-443, Ile-460 to Gln-467, Gln-510 to Glu-533, Ala-541 to Ala-548, Gln-561 to Glu-571, Leu-581 to Ala-590, Phe-639 to Ser-652.		H0617: 2, L0769: 2, L0771: 2, L0662: 2, L0649: 2, L0806: 2, L0438: 2, S0328: 2, H0694: 2, L0439: 2, L0751: 2, L0780: 2, L0592: 2, L0608: 2, H0650: 1, L0785: 1, H0638: 1, H0208: 1, S0132: 1, H0370: 1, H0438: 1, H0592: 1, H0599: 1, H0421: 1, H0596: 1, T0110: 1, H0597: 1, L0163: 1, L0455: 1, L0456: 1, H0124: 1, S0366: 1, H0040: 1, H0551: 1, H0059: 1, S0386: 1, T0042: 1, H0334: 1, S0144: 1, L0763: 1, L0770: 1, L0761: 1, L0772: 1, L0764: 1, L0774: 1, L0659: 1, L0789: 1, H0144: 1, H0520: 1, H0547: 1, H0658: 1, H0670: 1, S0378: 1, H0521: 1, L0749: 1, S0011: 1 and H0653: 1.		
612	HWLLR80	931564	622	1 - 630	1522	Pro-14 to Thr-20,	AR089: 2, AR061: 2		

							Glu-44 to Gly-50, Pro-104 to Gly-111, Gly-127 to Leu-132, Asn-146 to Asp-151, Asn-165 to Glu-170, Ser-194 to Asp-202.	S0358: 1, H0370: 1, H0253: 1, H0040: 1, H0547: 1, L0601: 1 and S0196: 1.		
613	HWLWQ87	932577	623	76 - 519	1523	Ile-11 to Glu-19.	AR089: 23, AR061: 12 L0731: 6, L0766: 5, L0759: 5, L0471: 2, H0038: 2, L0748: 2, L0740: 2, L0758: 2, L0590: 2, S0360: 1, H0596: 1, H0046: 1, L0483: 1, H0644: 1, H0616: 1, H0509: 1, H0647: 1, S0210: 1, L0648: 1, L0363: 1, L0774: 1, L0775: 1, L0657: 1, L0526: 1, L0666: 1, L0664: 1, S0126: 1, H0672: 1, L0744: 1, L0593: 1, L0595: 1, H0665: 1 and S0194: 1.			
614	H6EEP53	942872	624	3 - 1595	1524		AR061: 1, AR089: 1 L0748: 8, L0769: 7, L0758: 7, L0749: 5, H0135: 4, S0418: 3, S0358: 3, H0618: 3, H0424: 3, H0529: 3,			

[illegible]

616	HFXHD52	490721	626	191 - 3	1526	Asn-44 to Ala-51.	H0624: 2 and S0031: 1. S0001: 1, S0045: 1 and S0216: 1.		
		883683	888	1 - 279	1788	Phe-2 to Ser-8, Glu-58 to Gln-63, Asn-74 to Leu-81.			
617	HPMAM67	915879	627	2 - 64	1527		L0777: 20, L0439: 11, L0747: 10, S0360: 6, L0766: 6, L0758: 6, L0717: 5, H0521: 5, H0038: 3, S0330: 3, L0752: 3, L0755: 3, L0599: 3, S0358: 2, H0581: 2, S0003: 2, S0214: 2, H0068: 2, L0764: 2, L0662: 2, L0655: 2, L0666: 2, L0665: 2, H0648: 2, L0740: 2, L0751: 2, L0749: 2, L0750: 2, L0731: 2, L0757: 2, S0031: 2, L0596: 2, L0581: 2, L0362: 2, S0192: 2, H0542: 2, S0040: 1, H0650: 1, H0657: 1, S0282: 1, H0580: 1, H0393: 1, H0586: 1, H0574: 1, H0486: 1, L0586: 1, H0013: 1, L0021: 1,		

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619	HELG94	566768	890	489 - 1295	1790	Lys-57 to Pro-62, Ser-108 to Ala-114, Asp-133 to Arg-140, Arg-173 to Asn-183.	L0608: 3, H0624: 1, H0589: 1, H0438: 1, H0250: 1, S0050: 1, H0135: 1, S0144: 1, H0689: 1 and S0028: 1.		
		847653	891	30 - 647	1791	Cys-32 to Cys-39, Glu-47 to Pro-52, Lys-57 to Pro-62, Ser-108 to Ala-114, Asp-133 to Arg-140, Arg-173 to Asn-183.			
		847655	892	748 - 1923	1792	Asp-72 to Glu-78, Ser-103 to Glu-110, Lys-112 to His-117.			
						Lys-42 to Pro-47, Ser-93 to Ala-99, Asp-118 to Arg-125, Arg-158 to Asn-168, Ala-251 to Val-263, His-287 to Tyr-292, Glu-302 to Gln-307.			
619	HELG94	913938	629	1 - 1437	1529	Gly-1 to Ser-8, Arg-10 to Ser-15, Leu-17 to Gly-22, Lys-115 to Ala-130, Tyr-149 to Gly-156, Asn-181 to Glu-190, Glu-252 to Glu-257, Ser-339 to Asp-347, Leu-356 to Leu-361,	AR089: 9, AR061: 5 H0584: 5, H0599: 5, H0556: 4, H0124: 4, H0559: 3, H0622: 3, H0341: 2, H0125: 2, S0045: 2, H0620: 2, H0024: 2, T0042: 2, L0665: 2, H0144: 2, H0265: 1, S6024: 1,	16p11.2	147781, 172471, 182381

						Ser-387 to Lys-395, Thr-470 to Ile-476.	H0583: 1, H0208: 1, S0046: 1, H0393: 1, S0278: 1, H0549: 1, H0550: 1, H0438: 1, H0586: 1, H0486: 1, H0250: 1, S0280: 1, H0618: 1, H0253: 1, H0009: 1, H0687: 1, H0284: 1, H0424: 1, H0031: 1, S0366: 1, H0116: 1, H0056: 1, S0038: 1, H0494: 1, H0132: 1, H0131: 1, H0130: 1, L0662: 1, L0803: 1, S0428: 1, S0216: 1, S0126: 1, H0518: 1, S0152: 1, S0118: 1, S0314: 1, L0759: 1 and S0011: 1.			
620	HLJDQ52	923110	630	3 - 824	1530	Gly-26 to Val-70, Ser-199 to Arg-204.	AR089: 15, AR061: 1 T0109: 1, H0013: 1, H0375: 1, H0509: 1, H0519: 1, H0690: 1, S0152: 1 and L0485: 1.			
621	HAAJAW40	1219455	631	68 - 2323	1531	Pro-7 to Arg-12, Leu-32 to His-52, Tyr-54 to Asp-69, Pro-74 to Gly-92, Glu-99 to Arg-125, Asp-130 to Glu-142,	AR089: 4, AR061: 1 L0803: 5, L0731: 4, L0662: 3, L0665: 3, S0276: 3, H0486: 2, H0575: 2, H0318: 2, L0794: 2, L0805: 2,			

						Thr-144 to Ala-153, Arg-197 to Lys-202, Leu-214 to Pro-227, Asp-245 to Arg-251, Gly-261 to Gln-267, Gly-283 to His-288, Ser-326 to Gln-336, Met-356 to Glu-361, Ala-438 to Ile-444, Ser-479 to Val-484, Arg-490 to Arg-499, Pro-509 to Gln-514, Glu-622 to Ser-628, Thr-653 to Arg-658, Glu-678 to Asp-752.					L0776: 2, L0809: 2, L0663: 2, H0684: 2, L0740: 2, L0759: 2, L0592: 2, H0624: 1, L0448: 1, H0341: 1, S0282: 1, H0663: 1, S0360: 1, H0580: 1, L0468: 1, H0587: 1, H0427: 1, S0010: 1, L0471: 1, H0644: 1, H0169: 1, L0456: 1, H0090: 1, H0264: 1, H0412: 1, H0561: 1, S0150: 1, S0002: 1, H0529: 1, L0638: 1, L0372: 1, L0649: 1, L0388: 1, L0659: 1, L0783: 1, L0789: 1, L0791: 1, H0519: 1, S0380: 1, H0522: 1, H0436: 1, L0747: 1, L0752: 1, L0757: 1, L0599: 1, H0542: 1, H0543: 1 and H0422: 1.			
		825697	893	1 - 765	1793							AR061: 0, AR089: 0 H0038: 3, H0156: 2, L0455: 1, H0616: 1, S0038: 1, H0538: 1 and S0028: 1.		
622	HATAZ67	1106635	632	2 - 598	1532	Asn-25 to Trp-34, Ile-51 to Asp-58, Gln-87 to Pro-93.								

		908326	894	3 - 809	1794	Asn-23 to Trp-32, Ile-49 to Asp-56, Gln-85 to Pro-91.				
623	HBUAC02	1220017	633	3 - 668	1533	Ala-8 to Thr-23, Pro-35 to Met-41, Asn-60 to Thr-65, Asn-89 to Glu-94, Pro-161 to Leu-167, Asp-184 to Trp-189, Phe-192 to Leu-206, Arg-215 to Leu-221.	AR089: 13, AR061: 8 S0152: 4, H0556: 3, H0265: 2, S3014: 2, H0543: 2, H0423: 2, H0161: 1, H0650: 1, H0402: 1, S0045: 1, S0046: 1, H0393: 1, H0599: 1, H0575: 1, H0618: 1, H0253: 1, S0182: 1, H0083: 1, H0594: 1, H0247: 1, H0124: 1, H0652: 1, S0144: 1, H0519: 1, H0651: 1, S0027: 1 and H0445: 1.			
		933546	895	3 - 818	1795	Ala-8 to Thr-23, Pro-35 to Met-41, Asn-60 to Thr-65, Asn-89 to Glu-94, Pro-161 to Leu-167, Asp-184 to Trp-189, Phe-192 to Pro-201, Pro-226 to Lys-231, Ala-237 to Pro-264.				
624	HCWEQ14	1117318	634	319 - 77	1534		AR089: 39, AR061: 8 H0305: 3			
		908245	896	1 - 177	1796	Leu-43 to Tyr-48.				

625	HDPWH41	1228148	635	1 - 642	1535	AR089: 6, AR061: 2 S0252: 5, S0268: 5, S0256: 4, S0228: 3, S0270: 3, S0258: 2, H0305: 2, H0090: 2, H0521: 2, L0740: 2, L0777: 2, H0657: 1, S0212: 1, H0661: 1, H0580: 1, L0717: 1, H0438: 1, H0486: 1, T0074: 1, H0581: 1, S0388: 1, H0412: 1, L0637: 1, L0766: 1, L0791: 1, S0216: 1, H0670: 1, S0380: 1, L0755: 1, H0445: 1, L0605: 1, L0592: 1, L0581: 1, L0593: 1 and H0543: 1.		
626	HDQEH61	772569	897	1 - 369	1797	AR089: 63, AR061: 13 H0616: 3, H0521: 3, H0046: 2, H0038: 2, S0045: 1, H0550: 1, H0013: 1, S0386: 1, H0494: 1, S0150: 1, H0520: 1, H0436: 1 and L0595: 1.		
		1213567	636	46 - 867	1536	Arg-68 to Ser-76. Ser-3 to Arg-11, Gln-68 to Thr-77, Pro-194 to Lys-203.		
		908303	898	2 - 766	1798	Gln-49 to Thr-58, Pro-175 to Lys-184.		

627	HD TDD72	587710	637	162 - 371	1537		AR089: 159, AR061: 142 H0486: 1	17p13.3	113721, 247200, 600059, 601545
628	HFRBN02	1152485	638	2 - 967	1538	Gly-114 to Gly-120, Pro-140 to Tyr-145, Asn-180 to Gly-185, Arg-274 to Ala-280, Gly-310 to Gly-317.	AR089: 3, AR061: 1 S0045: 1, S0050: 1, H0020: 1 and S0032: 1.		
		973667	899	2 - 409	1799	Gly-114 to Gly-120.			
629	HKAIH72	1107045	639	1 - 642	1539	Pro-9 to Ala-19, Ser-39 to Gly-46, Thr-54 to Gly-62, Ile-77 to Arg-84, Thr-122 to Met-132, Gln-134 to Gln-147.	AR089: 2, AR061: 2 L0766: 2, L0665: 2, H0395: 1, S0212: 1, S0360: 1, H0551: 1, H0494: 1, L0639: 1, L0521: 1, L0804: 1, H0682: 1 and L0749: 1.		
		761293	900	1 - 690	1800	Pro-9 to Ala-19, Ser-39 to Gly-46, Thr-54 to Gly-62, Ile-77 to Arg-84, Thr-122 to Met-132, Gln-134 to Gln-147.			
630	HMAAD90	1152487	640	334 - 2	1540	Ser-15 to Gln-23, Gly-79 to Asp-92, Gly-105 to Cys-111.	AR089: 2, AR061: 1 L0769: 7, L0783: 6, L0775: 5, L0748: 4, L0758: 4, L0622: 3, H0599: 3, H0373: 3, L0772: 3, L0777: 3, L0757: 3, S0045: 2,		

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631	HMABQ71	1105540	641	3 - 374	1541	His-173 to Asp-178, Arg-196 to Ser-202, Arg-214 to Val-220, Ser-243 to Leu-253, Arg-275 to Ile-283, Lys-367 to Phe-374, Gln-384 to Gly-389, Glu-430 to Lys-440.	AR089: 1, AR061: 0 S0144: 1 and H0521: 1.		
		729831	902	189 - 497	1802				
		1105131	642	82 - 405	1542		AR061: 4, AR089: 1 S0152: 1 and L0601: 1.		
632	HPJEV95	929723	903	82 - 408	1803				
		1219545	643	154 - 783	1543	His-91 to Gly-103, Gly-112 to Gly-117, Glu-129 to Glu-136, Gly-146 to Gly-151, Arg-168 to Glu-184, Arg-203 to Arg-210.	AR061: 16, AR089: 6 H0617: 10, S0358: 5, L0622: 4, H0620: 4, H0658: 4, L0623: 3, H0424: 3, H0549: 2, H0550: 2, H0586: 2, H0486: 2, H0546: 2, L0769: 2, L0773: 2, S0374: 2, S0206: 2, L0743: 2, L0750: 2, L0779: 2, L0731: 2, L0601: 2, H0624: 1, H0170: 1, H0171: 1, H0686: 1, H0295: 1, H0657: 1, H0484: 1, H0255: 1, S0420: 1,		
633	HSKYR59								

634	HSWAM16	933750	904	1 - 360	1804	1544	AR089: 4, AR061: 3			S0376: 1, S0360: 1, H0370: 1, H0455: 1, H0587: 1, T0060: 1, T0114: 1, H0599: 1, H0122: 1, H0327: 1, H0544: 1, H0545: 1, H0188: 1, H0688: 1, T0006: 1, H0213: 1, H0606: 1, H0673: 1, S0364: 1, S0366: 1, H0634: 1, H0087: 1, H0413: 1, H0334: 1, S0144: 1, L0598: 1, L0763: 1, L0796: 1, L0639: 1, L0761: 1, L0772: 1, L0373: 1, L0764: 1, L0774: 1, L0775: 1, L0783: 1, L0809: 1, L0666: 1, L0663: 1, H0651: 1, S0378: 1, H0521: 1, S0392: 1, H0478: 1, L0751: 1, L0747: 1, L0752: 1, L0755: 1, L0757: 1, H0445: 1, L0608: 1, L0361: 1, L0366: 1, H0542: 1 and H0543: 1.					

	H0617: 10, S0358: 5, L0622: 4, H0620: 4, H0658: 4, L0623: 3, H0424: 3, H0549: 2, H0550: 2, H0586: 2, H0486: 2, H0546: 2, L0769: 2, L0773: 2, S0374: 2, S0206: 2, L0743: 2, L0750: 2, L0779: 2, L0731: 2, L0601: 2, H0624: 1, H0170: 1, H0171: 1, H0686: 1, H0295: 1, H0657: 1, H0484: 1, H0255: 1, S0420: 1, S0376: 1, S0360: 1, H0370: 1, H0455: 1, H0587: 1, T0060: 1, T0114: 1, H0599: 1, H0122: 1, H0327: 1, H0544: 1, H0545: 1, H0188: 1, H0688: 1, T0006: 1, H0213: 1, H0606: 1, H0673: 1, S0364: 1, S0366: 1, H0634: 1, H0087: 1, H0413: 1, H0334: 1, S0144: 1, L0598: 1, L0763: 1, L0796: 1, L0639: 1, L0761: 1, L0772: 1, L0373: 1,	
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635	HSXCW82	933749	905	11 - 604	1805	Ala-2 to Gly-15, Glu-120 to Ser-125.	L0764: 1, L0774: 1, . L0775: 1, L0783: 1, L0809: 1, L0666: 1, L0663: 1, H0651: 1, S0378: 1, H0521: 1, S0392: 1, H0478: 1, L0751: 1, L0747: 1, L0752: 1, L0755: 1, L0757: 1, H0445: 1, L0608: 1, L0361: 1, L0366: 1, H0542: 1 and H0543: 1.		
		1164013	645	123 - 1442	1545	Leu-14 to Ile-19, Pro-69 to Pro-76, Glu-86 to Thr-91, Val-121 to Thr-127, Phe-183 to Gln-188, Gly-282 to Lys-291, Arg-337 to Asn-346.	AR061: 6, AR089: 5 H0556: 8, H0617: 6, L0659: 6, L0666: 6, L0596: 6, H0441: 5, L0665: 5, S0222: 4, T0010: 4, S0038: 4, H0657: 3, H0559: 3, H0013: 3, H0494: 3, L0804: 3, L0809: 3, H0547: 3, S0152: 3, H0521: 3, H0265: 2, H0656: 2, L0717: 2, S0278: 2, H0250: 2, H0575: 2, S0049: 2, H0620: 2, H0288: 2, H0213: 2, S0036: 2,		

							L0794: 1, L0803: 1, L0806: 1, L0509: 1, L0657: 1, L0383: 1, L0787: 1, L0663: 1, S0374: 1, H0593: 1, H0658: 1, H0522: 1, H0134: 1, H0555: 1, L0612: 1, S3012: 1, S0037: 1, S3014: 1, S0206: 1, L0439: 1, L0749: 1, L0752: 1, S0031: 1, L0592: 1, L0608: 1, L0366: 1, H0667: 1, S0276: 1, H0542: 1 and H0423: 1.				
							Leu-14 to Ile-19.	1806		22q13.1-q13.2	
636	HSYDB42	739372	906	115 - 387	1546	Arg-1 to Thr-11, Pro-23 to Met-29, Asn-48 to Thr-53, Asn-77 to Glu-82, Pro-149 to Leu-155, Asp-172 to Trp-177, Phe-180 to Leu-194, Arg-203 to Leu-209.	AR061: 2, AR089: 1 H0305: 5, L0766: 3, L0748: 3, H0265: 2, H0556: 2, H0551: 2, H0494: 2, L0770: 2, L0758: 2, L0599: 2, L0361: 2, H0650: 1, H0657: 1, H0381: 1, H0419: 1, H0427: 1, H0618: 1, H0421: 1, H0530: 1, H0546: 1, H0413: 1, H0625: 1, L0369: 1, L0644: 1, L0521: 1, L0375: 1,	103050, 103050, 124030, 124030, 138981, 182380, 188826, 190040, 190040, 190040			

637	HTXKJ79	1193059	647	2 - 421	1547	Pro-3 to Leu-9, Glu-12 to Val-22, Gln-27 to Glu-33, Pro-68 to Glu-75.	L0783: 1, L0809: 1, L0789: 1, H0144: 1, S0374: 1, L0565: 1, H0658: 1, S0330: 1, H0539: 1, L0777: 1, L0731: 1, H0542: 1 and H0506: 1.		
						AR089: 3, AR061: 3 L0748: 9, S0356: 8, S0358: 8, L0471: 5, H0144: 5, L0740: 5, H0543: 5, H0574: 4, H0556: 3, S0354: 3, S0360: 3, S0049: 3, H0083: 3, T0042: 3, H0494: 3, S0374: 3, H0134: 3, H0436: 3, H0624: 2, H0663: 2, S0007: 2, S0132: 2, H0486: 2, H0013: 2, H0036: 2, H0251: 2, H0009: 2, S0036: 2, H0412: 2, H0561: 2, S0142: 2, H0522: 2, L0750: 2, L0588: 2, H0159: 1, H0583: 1, H0656: 1, H0341: 1, S0212: 1, H0240: 1, H0125: 1, S0418: 1, S0420: 1, S0410: 1,			

									S0045: 1, H0411: 1, H0369: 1, H0586: 1, H0497: 1, H0643: 1, H0331: 1, S0010: 1, H0052: 1, H0327: 1, H0544: 1, H0545: 1, H0011: 1, H0012: 1, H0014: 1, H0015: 1, H0239: 1, H0266: 1, H0688: 1, H0124: 1, H0135: 1, H0040: 1, H0413: 1, H0059: 1, H0280: 1, S0344: 1, H0529: 1, H0691: 1, H0547: 1, H0519: 1, H0682: 1, H0660: 1, S0328: 1, H0518: 1, H0521: 1, S0037: 1, S3014: 1, S0028: 1, L0742: 1, L0752: 1, L0755: 1, S0026: 1, H0136: 1 and H0293: 1.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
638	HUSGQ19	938963	907	99 - 443	1807																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

									S0212: 1, H0661: 1, H0580: 1, L0717: 1, H0438: 1, H0486: 1, T0074: 1, H0581: 1, S0388: 1, H0412: 1, L0637: 1, L0766: 1, L0791: 1, S0216: 1, H0670: 1, S0380: 1, L0755: 1, H0445: 1, L0605: 1, L0592: 1, L0581: 1, L0593: 1 and H0543: 1.		
									Arg-1 to Asp-13, Arg-81 to Ser-89, Gly-128 to Gly-143.		
639	HUSZS75	1193982	649	1 - 519	1549	1808	772568	908	2 - 517		
									Arg-54 to Pro-67, Arg-82 to Ala-90, Gln-105 to Asp-115.		
									AR089: 1, AR061: 1 L0769: 10, L0754: 10, L0766: 5, L0803: 4, L0756: 4, L0779: 4, L0780: 4, L0748: 3, L0753: 3, H0620: 2, H0264: 2, L0770: 2, L0806: 2, L0741: 2, L0747: 2, L0604: 2, H0265: 1, H0556: 1, H0657: 1, H0656: 1, H0341: 1, H0392: 1, H0331: 1, H0559: 1, H0427: 1, L0021: 1, H0173: 1, H0052: 1,		

640	HWBDR25	908443 1174365	909 650	64 - 918 3 - 1259	1809 1550	Arg-7 to Thr-13. Pro-1 to Glu-13, Gln-29 to Asn-35, Tyr-38 to Asn-43, Ala-102 to Ser-108, Arg-124 to Ile-134, Asp-172 to Asp-180, Lys-247 to Asn-252, Gly-336 to Trp-342. Lys-37 to Asn-42, Gly-126 to Trp-132.	T0115: 1, H0188: 1, H0135: 1, H0413: 1, H0561: 1, H0647: 1, L0763: 1, L0761: 1, L0373: 1, L0768: 1, L0774: 1, L0651: 1, L0776: 1, L0659: 1, L0809: 1, L0787: 1, L0791: 1, L0792: 1, H0684: 1, H0521: 1, L0777: 1, L0752: 1, L0759: 1 and L0485: 1.		
		659873	910	3 - 542	1810		AR089: 5, AR061: 1 H0551: 2, S0420: 1, H0580: 1, H0586: 1, S0002: 1, H0435: 1 and H0521: 1.		
641	HBGSS51	954855	651	341 - 3	1551		AR061: 5, AR089: 4 L0771: 12, H0040: 2, H0539: 2, H0306: 1, H0617: 1 and H0135: 1.		

[42] The first column in Table 1A provides the gene number in the application corresponding to the clone identifier. The second column in Table 1A provides a unique "Clone ID NO:Z" for a cDNA clone related to each contig sequence disclosed in Table 1A. This clone ID references the cDNA clone which contains at least the 5' most sequence of the assembled contig and at least a portion of SEQ ID NO:X was determined by directly sequencing the referenced clone. The reference clone may have more sequence than described in the sequence listing or the clone may have less. In the vast majority of cases, however, the clone is believed to encode a full-length polypeptide. In the case where a clone is not full-length, a full-length cDNA can be obtained by methods described elsewhere herein.

[43] The third column in Table 1A provides a unique "Contig ID" identification for each contig sequence. The fourth column provides the "SEQ ID NO:" identifier for each of the contig polynucleotide sequences disclosed in Table 1A. The fifth column, "ORF (From-To)", provides the location (i.e., nucleotide position numbers) within the polynucleotide sequence "SEQ ID NO:X" that delineate the preferred open reading frame (ORF) shown in the sequence listing and referenced in Table 1A, column 6, as SEQ ID NO:Y. Where the nucleotide position number "To" is lower than the nucleotide position number "From", the preferred ORF is the reverse complement of the referenced polynucleotide sequence.

[44] The sixth column in Table 1A provides the corresponding SEQ ID NO:Y for the polypeptide sequence encoded by the preferred ORF delineated in column 5. In one embodiment, the invention provides an amino acid sequence comprising, or alternatively consisting of, a polypeptide encoded by the portion of SEQ ID NO:X delineated by "ORF (From-To)". Also provided are polynucleotides encoding such amino acid sequences and the complementary strand thereto.

[45] Column 7 in Table 1A lists residues comprising epitopes contained in the polypeptides encoded by the preferred ORF (SEQ ID NO:Y), as predicted using the algorithm of Jameson and Wolf, (1988) Comp. Appl. Biosci. 4:181-186. The Jameson-Wolf antigenic analysis was performed using the computer program PROTEAN (Version 3.11 for the Power MacIntosh, DNASTAR, Inc., 1228 South Park Street Madison, WI). In specific embodiments, polypeptides of the invention comprise, or alternatively consist of, at least one, two, three, four, five or more of the predicted epitopes as described in Table 1A.

It will be appreciated that depending on the analytical criteria used to predict antigenic determinants, the exact address of the determinant may vary slightly.

[46] Column 8 in Table 1A provides an expression profile and library code: count for each of the contig sequences (SEQ ID NO:X) disclosed in Table 1A, which can routinely be combined with the information provided in Table 4 and used to determine the tissues, cells, and/or cell line libraries which predominantly express the polynucleotides of the invention. The first number in column 8 (preceding the colon), represents the tissue/cell source identifier code corresponding to the code and description provided in Table 4. For those identifier codes in which the first two letters are not "AR", the second number in column 8 (following the colon) represents the number of times a sequence corresponding to the reference polynucleotide sequence was identified in the tissue/cell source. Those tissue/cell source identifier codes in which the first two letters are "AR" designate information generated using DNA array technology. Utilizing this technology, cDNAs were amplified by PCR and then transferred, in duplicate, onto the array. Gene expression was assayed through hybridization of first strand cDNA probes to the DNA array. cDNA probes were generated from total RNA extracted from a variety of different tissues and cell lines. Probe synthesis was performed in the presence of ^{33}P dCTP, using oligo(dT) to prime reverse transcription. After hybridization, high stringency washing conditions were employed to remove non-specific hybrids from the array. The remaining signal, emanating from each gene target, was measured using a Phosphorimager. Gene expression was reported as Phosphor Stimulating Luminescence (PSL) which reflects the level of phosphor signal generated from the probe hybridized to each of the gene targets represented on the array. A local background signal subtraction was performed before the total signal generated from each array was used to normalize gene expression between the different hybridizations. The value presented after "[array code]:" represents the mean of the duplicate values, following background subtraction and probe normalization. One of skill in the art could routinely use this information to identify normal and/or diseased tissue(s) which show a predominant expression pattern of the corresponding polynucleotide of the invention or to identify polynucleotides which show predominant and/or specific tissue and/or cell expression.

[47] Column 9 in Table 1A provides a chromosomal map location for certain polynucleotides of the invention. Chromosomal location was determined by finding exact matches to EST and cDNA sequences contained in the NCBI (National Center for Biotechnology Information) UniGene database. Each sequence in the UniGene database is

assigned to a "cluster"; all of the ESTs, cDNAs, and STSs in a cluster are believed to be derived from a single gene. Chromosomal mapping data is often available for one or more sequence(s) in a UniGene cluster; this data (if consistent) is then applied to the cluster as a whole. Thus, it is possible to infer the chromosomal location of a new polynucleotide sequence by determining its identity with a mapped UniGene cluster.

[48] A modified version of the computer program BLASTN (Altshul et al., J. Mol. Biol. 215:403-410 (1990); and Gish and States, Nat. Genet. 3:266-272 (1993)) was used to search the UniGene database for EST or cDNA sequences that contain exact or near-exact matches to a polynucleotide sequence of the invention (the 'Query'). A sequence from the UniGene database (the 'Subject') was said to be an exact match if it contained a segment of 50 nucleotides in length such that 48 of those nucleotides were in the same order as found in the Query sequence. If all of the matches that met this criteria were in the same UniGene cluster, and mapping data was available for this cluster, it is indicated in Table 1A under the heading "Cytologic Band". Where a cluster had been further localized to a distinct cytologic band, that band is disclosed; where no banding information was available, but the gene had been localized to a single chromosome, the chromosome is disclosed.

[49] Once a presumptive chromosomal location was determined for a polynucleotide of the invention, an associated disease locus was identified by comparison with a database of diseases which have been experimentally associated with genetic loci. The database used was the Morbid Map, derived from OMIM™ (*supra*). If the putative chromosomal location of a polynucleotide of the invention (Query sequence) was associated with a disease in the Morbid Map database, an OMIM reference identification number was noted in column 10, Table 1A, labelled "OMIM Disease Reference(s)". Table 5 is a key to the OMIM reference identification numbers (column 1), and provides a description of the associated disease in Column 2.

TABLE 1B

Clone ID NO:Z	SEQ ID NO:X	CONTIG ID:	BAC ID: A	SEQ ID NO:B	EXON From-To
HADTU18	26	666268	AC067849	1811	1-1270
HADTU18	26	666268	AC067849	1812	1-408
HYAAH23	42	1032585	AL158156	1813	1-134 381-1154 1539-2051 2660-4011 4082-4116 4578-5063 5736-6373 6388-6981 7052-7364 7527-7659 7698-7943 9535-9659 9671-10133 11759-12221
HYAAH23	42	1032585	AL158155	1814	1-171 2177-2317 2558-3332 3786-4298 4772-6123 6194-6228 6690-7175 7848-8485 8500-9065 9164-9476 9639-9771 9810-10055 11647-11771 11783-12245 13870-14332
HYAAH23	42	1032585	AL158156	1815	1-4481
HYAAH23	42	1032585	AL158155	1816	1-4477
HAJAV28	45	948630	AL121579	1817	1-175 1520-1889 2329-2473 2730-2805 3231-3444 4096-4273 7815-7900 8874-9058
HCE1S21	49	671209	AC007666	1818	1-122 274-371

					3724-3890 4511-4668 5669-6372 6679-7654
HCE1S21	49	671209	AC000052	1819	1-122 274-371 1127-1238 3724-3890 4511-4668 5669-6372 6679-7654
HCE1S21	49	671209	AC004019	1820	1-122 274-371 1127-1238 3724-3890 4511-4668 5669-6372 6679-7654
HCE1S21	49	671209	AC007666	1821	1-269 324-413
HCE1S21	49	671209	AC007666	1822	1-591 2367-2471 4522-4940 4990-5100 6036-6133 6225-6754 7871-7959 8764-9481
HCE1S21	49	671209	AC000052	1823	1-269 324-413
HCE1S21	49	671209	AC000052	1824	1-591 2366-2473
HCE1S21	49	671209	AC004019	1825	1-269 324-413
HCE1S21	49	671209	AC004019	1826	1-462
HCE3J64	50	951228	AC061705	1827	1-77 614-729 917-1028 1154-1218 1398-1591 1704-1802 2419-3315
HCFLI54	52	921382	AC023278	1828	1-1977 2006-3504 3802-4090 4113-6041 6143-6242 6252-6919

					6933-7614 7682-8351
HCFLI54	52	921382	AC005562	1829	1-3490 3783-4087 4094-6238 6249-6901 6930-7364 7701-8350
HCFLI54	52	921382	AC023278	1830	1-574 774-1443
HCFLI54	52	921382	AC023278	1831	1-616
HCFLI54	52	921382	AC005562	1832	1-667
HCWDL45	55	889416	AC023100	1833	1-1181
HCWDL45	55	889416	Z98747	1834	1-1181
HDPGQ74	59	691163	AC073462	1835	1-173 1923-2056 2270-2362 4504-5101 5444-5630 6218-6268 8466-8542 8816-8888 10396-10437
HDPGS68	60	752975	AC034180	1836	1-950
HE2FR50	64	508498	AC010408	1837	1-574 1043-1729 1759-1995 2866-3391 3406-3626 3954-4396 4444-4667 5413-5515 8692-8774 8878-9828 13011-13373 14082-14365 15285-16319
HEBGK01	67	963673	Z97653	1838	1-627 815-1256 2165-2714
HEBGK01	67	963673	Z97653	1839	1-146
HEBGK01	67	963673	Z97653	1840	1-487
HEFMB30	68	691516	AC016659	1841	1-862
HEFMB30	68	691516	AC012481	1842	1-862
HEFMB30	68	691516	AC016659	1843	1-447
HEFMB30	68	691516	AC012481	1844	1-447
HEOPE58	69	851009	AL078634	1845	1-40 1089-1226

					3206-3637 4312-4463 7455-8330 8603-8815 9078-9190 9522-9767 10946-12260 13754-14357 15092-15830 18660-18822 21128-21635 21685-21721
HEOPE58	69	851009	AL078634	1846	1-235 3051-3154 3199-3734
HEOPE58	69	851009	AL078634	1847	1-444
HLHDD45	75	942901	AC024148	1848	1-116 629-787 1238-1305 1825-1969 2522-2966 2984-6238
HLHDD45	75	942901	AC069253	1849	1-116 629-787 1238-1305 1824-1968 2521-2965 2983-5879
HLHDD45	75	942901	AC044892	1850	1-116 629-787 1238-1305 1824-1968 2521-2965 2983-6236
HLHDD45	75	942901	AC044892	1851	1-105
HLHDD45	75	942901	AC069253	1852	1-105
HNHEQ86	79	785580	AC024653	1853	1-731
HSICX21	88	531267	AC016333	1854	1-552
HSICX21	88	531267	AC024101	1855	1-551
HSICX21	88	531267	AC016333	1856	1-448
HSICX21	88	531267	AC024101	1857	1-447
HSODC08	91	966264	AC005332	1858	1-1096 1112-1196 2142-2580 2893-3071 3148-3485 4737-5087 6182-6336

					6503-6667 7642-8422 8767-9265
HSODC08	91	966264	AC005332	1859	1-205 221-693
HSODC08	91	966264	AC005332	1860	1-181
HSQCM85	93	963554	AL021918	1861	1-629
HTOLA82	94	844319	AC012446	1862	1-410
HTOLA82	94	844319	AC012446	1863	1-329
HUUDH57	95	931155	AC009073	1864	1-118 2843-2982 5373-5675 6891-7201 8485-8641 9497-9900 10048-10506 10621-11749 12563-12695 12919-13053 14526-14766 16311-16378 17695-17869 18462-18541 19565-19750 21028-21485 25002-26608 26801-28071 28114-28369 28825-28998 29505-29648 31878-31961 32637-32809 32835-32936 33645-35911
HWAFW39	97	947915	AC008508	1865	1-124 2706-3000 3745-3882 5914-6036 6110-6413 6491-6844 6912-7681 8888-9020 10437-10570 10686-11022
HWAFW39	97	947915	AC008955	1866	1-544 2059-2219 2947-3088 5596-5891

					6635-6773 8782-8904 8978-9281 9359-9712 9778-10496
HWAFW39	97	947915	AC008963	1867	1-124 2645-2940 3685-3822 5831-5953 6027-6330 6408-6761 6828-7597 8806-8938 10353-10487 10603-10939 12315-12471 13563-13693 14450-14528 15001-16291
HWAFW39	97	947915	AC009073	1868	1-240 2827-3055 4160-4703 6218-6382 7102-7248 9770-10061 10805-10943 12952-13074 13148-13451 13529-13882 13951-14720 15927-16059 17474-17607 17723-18059 19435-19592 20686-20816 21573-21651 22124-23668 24035-24199 24212-24595 24879-25065 25816-26017 26260-26422 26424-26555 26824-27350 27380-27598 27609-27697 29321-29822 30645-30922

					31155-31244 31552-35653 35933-36067 36391-38070 38077-38991 39063-39584 40088-40196 40614-40660 41408-41837 41924-42048 42066-42712 42745-42876 43068-43760 43825-44062 44913-46162 46311-47285 47523-47779 50015-50221 50441-50512 50601-50653 50832-51143 52660-53226 53353-53439 53447-53826 53936-54038 57264-57491 59462-59560
HWAFFW39	97	947915	AC009073	1869	1-452
HWAFFW39	97	947915	AC008955	1870	1-229
HWAFFW39	97	947915	AC008963	1871	1-146
HBGDA14	114	866258	AC074220	1872	1-919
HBGDA14	114	866258	AC024580	1873	1-682
HDPND85	119	852628	AC003042	1874	1-261 1877-2339 3059-3286 3970-4326 4931-5114 6268-6359 7022-7866 7877-8140 8262-8911
HDPND85	119	852628	AC003042	1875	1-754 955-1048 6079-6214 6309-6423 6705-7373
HE9RE21	122	888243	AC040908	1876	1-203
HKABI68	125	856590	AC007606	1877	1-650

					709-802 3445-3584 3925-4225 4428-4595 5220-5285 5346-5673 5789-5962 7106-7206 8427-8807 9869-10247 10688-11328 11382-12036 12610-13224
HKABI68	125	856590	AC007606	1878	1-1215 1651-1783 1974-2304 2681-2756
HWHPO29	134	857383	AL049779	1879	1-210 1909-2318 2599-2753 3548-3655 4479-4690 6391-6879 7696-8065 10475-10649 11240-11950
HNTMD81	167	929511	AL138795	1880	1-327 2886-2923 3052-3182 3604-3784 4304-4446 4671-4764 4948-5014 5186-5345 5443-5566 5923-6025 6558-8807 9222-9363 9502-9626 9862-9937 10087-10280 10803-11470
HNTMD81	167	929511	AL365403	1881	1-133 358-451 635-701 873-1032 1130-1253 1610-1712

					2245-2912
HNTMD81	167	929511	AL365403	1882	1-131
HNTMD81	167	929511	AL138795	1883	1-634
HSKCI43	169	506599	AC068494	1884	1-826
HAMFW05	230	957586	AC005594	1885	1-103 2099-2278 2831-3511 4124-4482 6695-6777 7930-8084 8758-8898 9553-9738 10471-10829 11883-12031 12754-12992 13983-14296 14330-14468 14814-14959 15524-15766 17708-17819 18969-19670 20698-22428
HAMFW05	230	957586	AC005594	1886	1-232
HTDAB17	249	890384	AC011078	1887	1-297 359-416 3247-3653 6083-6236 9753-10036 11128-11233 12148-12514 12635-13141 15604-16463 19071-19190 19476-20232 20321-20638 21200-21594 21959-22219 23120-23362 23467-24143 24766-24853 25725-26143 26310-26455 27545-30619 30708-31169
HODGC61	277	973449	AC020695	1888	1-663
HODGC61	277	973449	AC017086	1889	1-663
HODGC61	277	973449	AC020695	1890	1-340
HODGC61	277	973449	AC017086	1891	1-340

HEOQP44	315	942596	AC025354	1892	1-747
HEOQP44	315	942596	AL022167	1893	1-1796
HEOQP44	315	942596	AC068470	1894	1-706
HEOQP44	315	942596	AL022344	1895	1-2022
HEOQP44	315	942596	AC006510	1896	1-1150
HEOQP44	315	942596	AC006096	1897	1-2211
HEOQP44	315	942596	AC006106	1898	1-2215
HEOQP44	315	942596	AC006108	1899	1-2210
HEOQP44	315	942596	U82205	1900	1-2213
HEOQP44	315	942596	U82208	1901	1-2212
HEOQP44	315	942596	AC006171	1902	1-2213
HEOQP44	315	942596	AC006177	1903	1-2212 2216-2455 2951-4547 4559-4639 4902-5697
HEOQP44	315	942596	AC006094	1904	1-1984
HEOQP44	315	942596	AC006185	1905	1-2206
HEOQP44	315	942596	AC006184	1906	1-2204 2208-2447 2943-3574 3724-4540 4552-4633 4896-5715
HEOQP44	315	942596	AC006172	1907	1-2211
HEOQP44	315	942596	AC006099	1908	1-2212
HEOQP44	315	942596	AC006103	1909	1-2213
HEOQP44	315	942596	AC006098	1910	1-2212
HEOQP44	315	942596	AC006096	1911	1-240 737-1362
HEOQP44	315	942596	AC006106	1912	1-240 736-1423
HEOQP44	315	942596	AC006108	1913	1-240 736-1359
HEOQP44	315	942596	U82205	1914	1-255 736-849 1023-1457
HEOQP44	315	942596	U82208	1915	1-240 736-1425
HEOQP44	315	942596	AC006171	1916	1-247 1217-1320 1624-1963 2076-2179 2604-2711 2716-3114 3399-3638 4344-4427 5079-5141

					5439-8153 8268-8798
HEOQP44	315	942596	AC006096	1917	1-110
HEOQP44	315	942596	AC006177	1918	1-67 1558-1614 1692-2134 2610-2767 4075-4344 5072-5484 5971-6837 7042-7752
HEOQP44	315	942596	U82205	1919	1-28 384-522 2412-6373 6598-7151 7230-7525 9388-9464 10003-10111
HEOQP44	315	942596	U82208	1920	1-511
HEOQP44	315	942596	AC006171	1921	1-240 736-1540 7244-8075 8087-8167
HEOQP44	315	942596	AC006094	1922	1-210
HEOQP44	315	942596	AC006185	1923	1-240 736-1359
HEOQP44	315	942596	AC006172	1924	1-240 847-1425
HEOQP44	315	942596	AC006184	1925	1-130
HEOQP44	315	942596	AC006099	1926	1-416
HEOQP44	315	942596	AC006099	1927	1-240 736-1424
HEOQP44	315	942596	AC006103	1928	1-422
HEOQP44	315	942596	AC006103	1929	1-240 737-2325
HEOQP44	315	942596	AC006098	1930	1-291
HEOQP44	315	942596	AC006098	1931	1-240 736-1424
HHEKZ12	316	878267	Z81559	1932	1-1487
HHEKZ12	316	878267	AC006186	1933	1-852
HHEKZ12	316	878267	AC016135	1934	1-845
HHEKZ12	316	878267	AL022167	1935	1-1796
HHEKZ12	316	878267	Z81452	1936	1-2018 2193-2289 5113-6160
HHEKZ12	316	878267	AL022344	1937	1-2022
HHEKZ12	316	878267	U82210	1938	1-851
HHEKZ12	316	878267	AC006096	1939	1-2211

HHEKZ12	316	878267	AC006106	1940	1-2215
HHEKZ12	316	878267	AC006108	1941	1-2210
HHEKZ12	316	878267	U82205	1942	1-2213
HHEKZ12	316	878267	U82208	1943	1-2212
HHEKZ12	316	878267	AC006171	1944	1-2213
HHEKZ12	316	878267	AC006177	1945	1-2212 2216-2455 2951-4547 4559-4639 4902-5697
HHEKZ12	316	878267	AC009260	1946	1-745
HHEKZ12	316	878267	AC006094	1947	1-1984
HHEKZ12	316	878267	AC006179	1948	1-852
HHEKZ12	316	878267	AC006185	1949	1-2206
HHEKZ12	316	878267	AC006184	1950	1-2204 2208-2447 2943-3574 3724-4540 4552-4633 4896-5715
HHEKZ12	316	878267	AC006172	1951	1-2211
HHEKZ12	316	878267	AC006099	1952	1-2212
HHEKZ12	316	878267	AC006103	1953	1-2213
HHEKZ12	316	878267	AC006098	1954	1-2212
HHEKZ12	316	878267	AC006096	1955	1-240 737-1362
HHEKZ12	316	878267	AC006106	1956	1-240 736-1423
HHEKZ12	316	878267	AC006108	1957	1-240 736-1359
HHEKZ12	316	878267	U82205	1958	1-255 736-849 1023-1457
HHEKZ12	316	878267	U82208	1959	1-240 736-1425
HHEKZ12	316	878267	AC006171	1960	1-247 1217-1320 1624-1963 2076-2179 2604-2711 2716-3114 3399-3638 4344-4427 5079-5141 5439-8153 8268-8798
HHEKZ12	316	878267	AC006186	1961	1-87
HHEKZ12	316	878267	U82210	1962	1-87

HHEKZ12	316	878267	AC006096	1963	1-110
HHEKZ12	316	878267	AC006177	1964	1-67 1558-1614 1692-2134 2610-2767 4075-4344 5072-5484 5971-6837 7042-7752
HHEKZ12	316	878267	U82205	1965	1-28 384-522 2412-6373 6598-7151 7230-7525 9388-9464 10003-10111
HHEKZ12	316	878267	U82208	1966	1-511
HHEKZ12	316	878267	AC006171	1967	1-240 736-1540 7244-8075 8087-8167
HHEKZ12	316	878267	AC009260	1968	1-87
HHEKZ12	316	878267	AC006094	1969	1-210
HHEKZ12	316	878267	AC006179	1970	1-87
HHEKZ12	316	878267	AC006185	1971	1-240 736-1359
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HE2SY77	486	934771	AC010552	2189	1-332
HMUBI13	488	937820	AL031722	2190	1-346 653-733 955-1420 4507-4973 5126-5452

					5542-5799 6867-6981 8511-9361 10007-10142 10446-10936 11107-12123 12843-13346 13762-13939 13970-14115 14157-14350 14352-14452 17409-17464 17613-17714 17851-19815
HMUBI13	488	937820	AL132867	2191	1-1965
HMUBI13	488	937820	AC012180	2192	1-1964
HMUBI13	488	937820	AL031722	2193	1-1308
HMUBI13	488	937820	AL031722	2194	1-101
HMUBI13	488	937820	AL132867	2195	1-346 653-733 955-1420 4507-4973 5126-5452 5542-5799 8509-9358 10004-10139 10443-10933 11084-12100 12817-13320 13736-13913 13944-14089 14150-14304 17383-17438 17586-17687
HMUBI13	488	937820	AL132867	2196	1-101
HMUBI13	488	937820	AC012180	2197	1-101
HAFAH26	490	940254	AL353192	2198	1-1723 1892-5060
HAFAH26	490	940254	AC013708	2199	1-1723 1888-5062
HAFAH26	490	940254	AL354985	2200	1-1723 1888-5061
HAFAH26	490	940254	AL157762	2201	1-1724 1889-5063
HAFAH26	490	940254	AC013708	2202	1-297
HAFAH26	490	940254	AL354985	2203	1-297
HAFAH26	490	940254	AC013708	2204	1-366
HAFAH26	490	940254	AL157762	2205	1-366

HAFAH26	490	940254	AL157762	2206	1-297
HDPJH11	497	951371	AC024667	2207	1-93 4325-4485 8156-8260 9251-9460
HDPJH11	497	951371	AC024667	2208	1-436
HWADY95	501	951731	AC068426	2209	1-103 1135-1280 2068-2219 2711-2816 2838-3235 3559-4903
HWADY95	501	951731	AC012467	2210	1-765 1429-1580 2293-2424 3456-3601 4389-4540 5032-5137 5159-5556 5880-7210
HWADY95	501	951731	AC012467	2211	1-344
HWADY95	501	951731	AC012467	2212	1-555
HPCRA07	503	952124	AC015936	2213	1-540 1047-1330 1887-3313 3648-3758 3868-4165 4348-4516 4828-5035 5234-5330 5455-6124 6208-6297 6493-6624 6860-6943
HADFD82	506	953295	AL022328	2214	1-481 729-828 1094-1193 1289-1396 1553-1617 1798-1929 2089-2152 2247-4100 4146-4381 4518-4577 4865-4961 5157-5580 5725-6072
HADFD82	506	953295	AL022328	2215	1-723

HADFD82	506	953295	AL022328	2216	1-81 162-241 315-880 1024-1324 1365-1937 2215-2794
HLTCU08	514	960951	AL359452	2217	1-1504
HLTCU08	514	960951	AC005500	2218	1-3341
HLTCU08	514	960951	AC007731	2219	1-3341
HLTCU08	514	960951	AC005500	2220	1-923 4251-5635 6031-6618 6898-8078
HLTCU08	514	960951	AC005500	2221	1-411
HLTCU08	514	960951	AC007731	2222	1-923 4251-5635 6031-6618 6898-8078
HLTCU08	514	960951	AC007731	2223	1-411
HTKAA03	516	961002	AC073152	2224	1-465
HTKAA03	516	961002	AC073152	2225	1-638
HMSGF27	517	962420	AL356652	2226	1-191 227-519 2321-2362 2983-3223 4301-4435 4863-4968 7663-7820 7975-8116 8579-8760 8826-9095 9333-9460 11514-11621 12209-12595
HMSGF27	517	962420	AL356652	2227	1-264
HMSGF27	517	962420	AL356652	2228	1-659
HE2SB11	521	965611	AL139082	2229	1-428 2627-2696 3808-9516
HE2SB11	521	965611	AL139082	2230	1-423
HE2SB11	521	965611	AL139082	2231	1-378
HLICJ19	523	966969	AL139317	2232	1-32 2015-2578 2609-3255 3589-3628 4619-5174 6796-6965 7977-8037

					9549-9719 10720-10781 11892-11984 13002-16279
HLICJ19	523	966969	AL139317	2233	1-1541
HHEKP47	527	974402	AC023609	2234	1-304
HHEKP47	527	974402	AC074220	2235	1-238
HHEKP47	527	974402	AC023609	2236	1-529
HHEKP47	527	974402	AC074220	2237	1-367
HCEOX38	531	881200	AC005973	2238	1-221 228-420 636-800 1154-1400 1833-1916 2335-2450 2659-2749 2892-4525 4674-4925 5019-5177 5375-5547 5684-5785 5873-6024 6108-6270 6345-6660 6692-7868
HCEOX38	531	881200	AC005973	2239	1-562 570-740 801-1004
HCEOX38	531	881200	AC005973	2240	1-68 328-494 1925-2023
HPDVO67	533	911405	AC005954	2241	1-118 1208-1596 5809-5862 8096-8208 8442-8680 10094-10308 10499-10599 10960-11170 11298-11645 12507-12838 13149-13818 13929-14078 15553-15626 16027-16241 16318-16421 17336-17629 17807-18015

					18421-19058 19159-19221 19233-19928 20115-20644 20731-21386 22053-22267 22362-22535 22645-22988 23309-23476 23569-23649 23739-23886 24169-24295 25772-25881 25999-26204 27159-27504 27519-27621 28747-29313 29474-29846 30160-30276 31078-31168
HPDVO67	533	911405	AC005954	2242	1-131
HFXCU55	537	499457	AC034243	2243	1-641
HFXCU55	537	499457	AC020758	2244	1-587
HFXCU55	537	499457	AC020758	2245	1-65 72-459 633-1391 1401-1505 3814-3915 4909-5189 5410-6542 9420-9967 10046-10185 10271-10646
HCEBM51	541	536558	AC007326	2246	1-472 4950-5163 9929-10114 10431-10462 10950-11102 11348-11731 11834-11960 12266-12401 12974-13036 13215-13335 13748-13826 14441-15128 15278-15810 15951-16445 16552-16701

					17658-17839 17949-18318 18325-18679 19157-19768 20570-20920 21264-21605 22617-22714 22788-23458
HCEBM51	541	536558	AC008103	2247	1-472 4950-5163 9929-10114 10431-10462 10950-11102 11348-11731 11834-11976 12265-12400 12973-13035 13214-13334 13747-13825 14440-15127 15277-15809 15950-16444 16551-16700 17657-17838 17948-18317 18324-18678 19156-19767 20569-20919 21263-21604 22616-22713 22787-23457
HCEBM51	541	536558	AC007325	2248	1-472 4950-5163 9929-10114 10431-10462 10950-11102 11348-11731 11834-11978 12266-12401 12974-13036 13215-13335 13748-13826 14442-15129 15279-15811 15952-16446 16553-16702 17659-17840 17950-18674

					19152-19763 20565-20915 21259-21600 22611-22708 22782-23452
HCEBM51	541	536558	AC007326	2249	1-556 1064-2403 2424-3605 3819-4142 4155-4274 4702-5531 5609-5785
HCEBM51	541	536558	AC007326	2250	1-164
HCEBM51	541	536558	AC008103	2251	1-556 1064-2403 2424-3605 3819-4142 4155-4274 4702-5531 5612-5785
HCEBM51	541	536558	AC008103	2252	1-164
HCEBM51	541	536558	AC007325	2253	1-556 1098-2437 2458-3639 3853-4176 4189-4308 4736-5565 5643-5819
HCEBM51	541	536558	AC007325	2254	1-164
HNHHW82	545	684342	AC074221	2255	1-160
HNHHW82	545	684342	AC020818	2256	1-709
HNHHW82	545	684342	AC020884	2257	1-709
HNHHW82	545	684342	AC074221	2258	1-408
HHFFG80	547	733387	AL135799	2259	1-127 1085-1228 1371-1531 1548-2225 2375-2593 3502-4133 4212-4554 4757-7640
HHFFG80	547	733387	AL135928	2260	1-127 1085-1228 1371-1531 1548-2225 2375-2593 3502-4133 4212-4554

					4757-7640
HHFFG80	547	733387	AL357556	2261	1-125 1370-1532 2542-2592 4216-4558 4948-5554
HHFFG80	547	733387	AC025395	2262	1-127 1085-1228 1371-1531 1548-2225 2375-2593 3503-4135 4215-4557 4760-8240
HHFFG80	547	733387	AL357556	2263	1-760 1068-1270 1409-2384
HSDKI89	551	786812	AC012620	2264	1-525
HLDQU68	553	825558	U95090	2265	1-160 239-402 3754-3867 3888-4257 4312-5026 6123-6276 6565-6847
HLDQU68	553	825558	U95090	2266	1-315
HLDQU68	553	825558	U95090	2267	1-142
HTXOH20	555	837509	AC013591	2268	1-97 2761-2844 4015-4414 8029-8100 9115-9571 10597-10742 10954-11043 11799-12484 12669-13256 13507-13594 13993-14102 14709-14853 15126-15192 15452-15534 16964-17513 17846-17960 18303-18418 18672-20097
HTXOH20	555	837509	AC013591	2269	1-110 921-1200
HSLFG13	556	847314	AC008792	2270	1-711

HSDAI07	559	859237	AC034099	2271	1-826
HSLDO63	562	866332	AC074219	2272	1-523
HSLDO63	562	866332	AC074219	2273	1-512
HNHAG26	563	866694	AC074220	2274	1-839
HNHAG26	563	866694	AC073351	2275	1-365
HEBCK42	566	875541	AC067749	2276	1-49 598-1355 1972-2268
HEBCK42	566	875541	AC067966	2277	1-758
HEBCK42	566	875541	AL355138	2278	1-49 598-1355 1974-2270
HEBCK42	566	875541	AL355138	2279	1-399
HEBCK42	566	875541	AC067749	2280	1-399
HFIJE03	572	914882	AC026265	2281	1-141
HFIJE03	572	914882	AP001893	2282	1-190 581-749 1831-2145 2181-2629 2713-3611 3960-4537 5661-5948 6024-6171 6801-7034 7311-7405 7979-9544
HFIJE03	572	914882	AP000717	2283	1-301 351-799 883-1782 2131-2708 3832-4119 4195-4342 4972-5205 5482-5576 6150-7715
HFIJE03	572	914882	AC011728	2284	1-301 351-799 883-1781 2130-2707 3831-4118 4194-4341 4971-5204 5481-5575 6149-7712
HTHDJ23	577	921274	AC068620	2285	1-2395 3653-3776 4371-4418
HTHDJ23	577	921274	AC068620	2286	1-733

HSQFX64	579	922581	AL049697	2287	1-1216 1879-2223 4381-4541 5424-5808 7119-7260 10651-10772 13801-13860 15071-15143 15616-15917 16189-17858 18042-18076 18423-18519 18638-19174 19787-20084 20299-20367 20825-21387
HSQFX64	579	922581	AL049697	2288	1-228
HSQFX64	579	922581	AL049697	2289	1-107
HEGAU68	588	950009	AC060820	2290	1-27 124-298 385-448 538-663 773-809 1010-1129 1442-1518 1636-1727 1855-1975 2263-2396 2492-2710 2875-4213 4346-4516 4572-6197 6278-6508 6762-7406 7537-7963 8181-8292 8539-8721 9815-9994 10264-10401
HEGAU68	588	950009	AC068946	2291	1-27 125-299 386-449 539-664 774-810 1011-1130 1443-1519 1637-1728 1856-1974

					2262-2395 2491-2709 2874-4212 4345-4515 4571-6197 6278-6501 7596-7957 8177-8265
HEGAU68	588	950009	AC060820	2292	1-145
HEGAU68	588	950009	AC068946	2293	1-238
HEGAU68	588	950009	AC068946	2294	1-145
HNGKH38	589	951032	AC019122	2295	1-439 1012-1359 1441-1505 2435-2624 2884-3145 3411-3503 3682-5647
HNGKH38	589	951032	AC019122	2296	1-314
HNGKH38	589	951032	AC019122	2297	1-333
HNHNN26	590	952398	AC078913	2298	1-591
HNHNN26	590	952398	AC010357	2299	1-577
HNHNN26	590	952398	AC074334	2300	1-576
HNHNN26	590	952398	AC074334	2301	1-283
HSLHV08	594	958582	AC074221	2302	1-741
HSLHV08	594	958582	AC055703	2303	1-536
HSLHV08	594	958582	AC022123	2304	1-209 284-376 407-598
HSLHV08	594	958582	AC074220	2305	1-741
HSLHV08	594	958582	AC074220	2306	1-610
HBGMN45	603	967744	AC022123	2307	1-249 484-1169
HSDKF67	607	933059	AC020885	2308	1-616
HCEPH84	614	910864	AC013603	2309	1-302 692-1498 2237-2673 5316-5528 6508-7733
HNFD052	615	916260	AC012307	2310	1-1998
HWLLR80	622	931564	AL139349	2311	1-172 4417-4509 4927-5011 6749-6896 8625-8845 8932-10907 10985-11137 12855-12935

					13320-13649 18210-18567 18714-18992 19154-19277 19328-19828 20293-20517 20709-21710
HWLLR80	622	931564	AL139349	2312	1-208
HSYDB42	646	933545	AL022318	2313	1-156 1369-1531 1988-2167 2802-3008 3540-3823 4045-6131
HSYDB42	646	933545	AL022318	2314	1-492
HSYDB42	646	933545	AL022318	2315	1-407 1173-1467 1693-1857
HBGSS51	651	954855	AC012615	2316	1-607 763-1910 2291-2402 2983-3588 4170-4242
HBGSS51	651	954855	AC012615	2317	1-451
HBGSS51	651	954855	AC012615	2318	1-2083 2996-3117 3196-3330 3338-3638 3847-4160 4362-4596 5559-6225 6740-7087 7196-7297 7410-7746 7903-8059 8362-8495 8982-9518 10231-10522 11163-11210

[50] Table 1B summarizes additional polynucleotides encompassed by the invention (including cDNA clones related to the sequences (Clone ID NO:Z), contig sequences (contig identifier (Contig ID:) contig nucleotide sequence identifiers (SEQ ID NO:X)), and genomic sequences (SEQ ID NO:B). The first column provides a unique clone identifier, "Clone ID NO:Z", for a cDNA clone related to each contig sequence. The second column provides the sequence identifier, "SEQ ID NO:X", for each contig sequence. The third column provides a unique contig identifier, "Contig ID:" for each contig sequence. The fourth column, provides a BAC identifier "BAC ID NO:A" for the BAC clone referenced in the corresponding row of the table. The fifth column provides the nucleotide sequence identifier, "SEQ ID NO:B" for a fragment of the BAC clone identified in column four of the corresponding row of the table. The sixth column, "Exon From-To", provides the location (i.e., nucleotide position numbers) within the polynucleotide sequence of SEQ ID NO:B which delineate certain polynucleotides of the invention that are also exemplary members of polynucleotide sequences that encode polypeptides of the invention (e.g., polypeptides containing amino acid sequences encoded by the polynucleotide sequences delineated in column six, and fragments and variants thereof).

TABLE 2

Clone ID NO:Z	Contig ID:	SEQ ID NO:X	Analysis Method	PFam/NR Description	PFam/NR Accession Number	Score/ Percent Identity	NT From	NT To
HHMMC14	1152250	11	blastx.2	GLYOXYLATE REDUCTASE (EC 1.1.1.79).	sp Q9UBQ7 Q9UBQ 7	96%	105	1088
HHMMC14	969371	652	HMMER 1.8	PFAM: D-isomer specific 2-hydroxyacid dehydrogenases	PF00389	217.83	336	965
HSLEQ79	1184946	12	blastx.14	(AF146018) hydroxypyruvate reductase [Homo sapiens]	gi 5639830 gb AAD4 5886.1 AF146018_1	96%	87	1070
HSLEQ79	752382	653	blastx.2	D-lactate dehydrogenase (EC 1.1.1.28) - Escherichia coli	pir G64888 G64888	93%	674	156
HSLEQ79	1082023	13	HMMER 2.1.1	PFAM: D-isomer specific 2-hydroxyacid dehydrogenases	PF00389	222	19	453
HUCME08	868780	654	blastx.2	GLYOXYLATE REDUCTASE (EC 1.1.1.79).	sp Q9UBQ7 Q9UBQ 7	88% 100%	110 54	625 107
HUCME08	1152254	14	HMMER 2.1.1	PFAM: D-isomer specific 2-hydroxyacid dehydrogenases	PF00389	93.4	275	556
HNGOW33	1152254	14	blastx.2	8-amino-7-oxononanoate synthase (EC 2.3.1.47) - Escherichia coli	pir D32025 SYECKP	91% 70%	547 336	1158 497

HNGOW33	957351	655	HMMER 2.1.1 blastx.14	PFAM: Aminotransferases class-II (AE000195) orf, hypothetical protein [Escherichia coli]	PF00222	441.9	409	1251
HT4GD03	1103896	15	blastx.2	2-AMINO-3- KETOBUTYRATE COENZYME A LIGASE, MITOCHONDRIAL 1	sp O75600 KBL_HU MAN	93% 100%	153 89	968 166
HT4GD03	923731	656	HMMER 1.8 blastx.14	PFAM: Aminotransferases class-II dJ466N1.2 (2-amino-3- ketobutyrate-CoA ligase mRNA, 1	PF00222	78.93	575	877
HAQBZ89	949061	16	HMMER 1.8 blastx.2	PFAM: Aminotransferases class- III pyridoxal-phosphate CG8745 PROTEIN.	gi 4808241 emb CAB 42830.1	100% 87% 100%	584 153 140	967 569 166
HCCCC81	949062	17	HMMER 1.8 blastx.2	PFAM: Aminotransferases class- III pyridoxal-phosphate hypothetical protein T01B11.2 - Caenorhabditis elegans	sp Q9VU95 Q9VU95 PF00202	52% 178.37	8 187	316 816
HE8PW83	927532	18	HMMER 1.8 blastx.2	PFAM: Aminotransferases class- III pyridoxal-phosphate ALANINE-- GLYOXYLATE AMINOTRANSFERASE	pir T25848 T25848 PF00202	46% 139.27	190 4	879 465
					sp Q64565 AGT2_R AT	83%	4	546

HE9QQ22	949080	19	HMMER 2.1.1	2 PRECURSOR (EC 1.1)	PFAM: Aminotransferases class- III pyridoxal-phosphate	PF00202	105.1	285	545
			blastx.2	ALANINE-- GLYOXYLATE AMINOTRANSFERASE 2 PRECURSOR (EC 1.1)	sp Q64565 AGT2_R AT		51% 43% 49%	3 545 682	1070 1003 999
HFPFB39	946170	20	HMMER 1.8	PFAM: Aminotransferases class- III pyridoxal-phosphate	PF00202		235.05	1613	714
			blastx.2	hypothetical protein T01B11.2 - Caenorhabditis elegans	pir T25848 T25848		49%	1613	651
HSDJI44	1151680	21	blastx.2	adenosylmethionine--8- amino-7-oxononanoate transaminase (EC 2.6.1.62) - Escherichia coli	pir F64813 XNECDP		96%	857	2143
HSDJI44	974784	657	HMMER 2.1.1	PFAM: Aminotransferases class- III pyridoxal-phosphate	PF00202		511.4	894	1835
			blastx.14	(AE000180) 7,8- dianinopelargonic acid synthetase [Escherichia coli]	gi 1786991 gb AAC7 3861.1		99% 100%	795 1837	1841 1860
HE9DG38	1181748	22	blastx.2	Putative selenocysteine lyase.	sp AAF36816 AAF36 816		99%	44	994
HE9DG38	943384	658	HMMER 2.1.1	PFAM: Aminotransferases class-	PF00266		215.1	160	1326

			V						
			blastx.14	similar to NIFS protein (nitrogen fixation) [Caenorhabditis elegans]	gi 722379 gb AAC46 685.1				
HGBAT24	1024746	23	blastx.2	phosphoserine transaminase (EC 2.6.1.52) - Escherichia coli	pir B64830 B64830		97%	1	369
HGBAT24	761143	659	HMMER 2.1.1	PFAM: Aminotransferases class- V	PF00266		128.3	10	369
HTDAF92	1181747	24	blastx.2	CDNA FLJ10515 FIS, CLONE NT2RP2000764, WEAKLY SIMILAR TO 1	sp BAA91659 BAA9 1659		100%	256	1011
HTDAF92	943385	660	HMMER 2.1.1	PFAM: Aminotransferases class- V	PF00266		104.6	163	597
			blastx.2	(AF175767) putative selenocysteine lyase [Homo 1	gb AAF36816.1 AF1 75767_1		100%	160	627
HAPSI19	668405	25	HMMER 1.8	PFAM: Cytochrome C and Quinol oxidase polypeptide I	PF00115		75.81	263	382
			blastx.2	cytochrome-c oxidase (EC 1.9.3.1) chain I - human	pir A00463 ODHU1		76% 95%	3 263	263 382

					mitochondrion			50%	28	87
								100%	385	399
HADTU18	666268	26	HMMER 1.8	PFAM: Cytochrome C oxidase subunit II	PF00116			99.8	185	307
			blastx.2	cytochrome-c oxidase (EC 1.9.3.1) chain II - human mitochondrion	pir A00472 OBHU2			48%	2	436
HNTEF53	954852	27	HMMER 1.8	PFAM: Cytochrome P450	PF00067			102.61	369	887
			blastx.2	prostaglandin omega- hydroxylase (EC 1.14.15.-) cytochrome 1	pir S32315 A29368			49%	821	1714
								42%	279	902
								60%	1705	1749
HWLLB11	954849	28	HMMER 1.8	PFAM: Cytochrome P450	PF00067			159.13	75	506
			blastx.2	CYTOCHROME P450 4C3 (EC 1.14.14.1) (CYP1VC3).	sp Q9VA27 Q9VA27			46%	78	512
								44%	4	75
HCRQK86	1193068	29	blastx.2	PROTEIN PHOSPHATASE 2C.	sp Q9Z1Z6 Q9Z1Z6			95%	164	1339
HCRQK86	918014	662	HMMER 2.1.1	PFAM: Protein phosphatase 2C	PF00481			248.4	467	1297
			blastx.14	(AF095927) protein phosphatase 2C [Rattus norvegicus]	gi 3777604 gb AAC9 7497.1			89%	149	1324
HOCOT88	933635	30	HMMER 2.1.1	PFAM: Protein phosphatase 2C	PF00481			196.9	643	1350
			blastx.2	protein phosphatase 2C- like protein - Arabidopsis thaliana	pir T50783 T50783			38%	619	1371
HELEF11	926930	31	HMMER	PFAM: Pyridoxal-	PF00282			202.9	146	565

				2.1.1	dependent decarboxylase conserved domain				
				blastx.2	glutamate decarboxylase (EC 4.1.1.15) beta - Escherichia coli	pir B43332 B43332	81% 100% 56% 47%	131 45 595 564	721 152 780 620
HOUGD29	1204714	32		blastx.2	PANCREAS-ENRICHED PHOSPHOLIPASE C.	sp Q9UHV3 Q9UHV3	97% 79%	202 3	1821 203
HOUGD29	909797	663		HMMER 2.1.1	PFAM: Phosphatidylinositol-specific phospholipase C, Y domain	PF00387	118.2	202	453
				blastx.14	(AF044576) phospholipase C PLC210 [Caenorhabditis elegans]	gi 2957270 gb AAC38963.1	42% 35% 58%	202 757 168	753 873 203
HSIGN57	910078	33		HMMER 2.1.1	PFAM: Phosphatidylinositol-specific phospholipase C, Y domain	PF00387	159.3	131	484
				blastx.2	PHOSPHOLIPASE C-L2.	sp Q9QYG1 Q9QYG1	83%	2	754
HTEPE35	948475	34		HMMER 2.1.1	PFAM: Phosphatidylinositol-specific phospholipase C, Y domain	PF00387	163.8	839	507
				blastx.2	1-phosphatidylinositol-4,5-bisphosphate phosphodiesterase 1	pir S14113 S14113	48%	839	90
HUFDB74	1227205	35		blastx.2	PHOSPHOINOSITIDE-SPECIFIC	sp Q91423 Q91423	60%	2	547

						PHOSPHOLIPASE C (FRAGMENT).						
HUFDB74	901451	664		HMMER 2.1.1		PFAM: Phosphatidylinositol- specific phospholipase C, Y domain	PF00387	89.4	2	127		
HBXAB33	1229908	36		blastx.2		growth/differentiation factor 5 - human	pir JC2347 JC2347	98%	54	581		
HBXAB33	957228	665		HMMER 2.1.1 blastx.14		PFAM: Aminotransferases class-I aspartate aminotransferase precursor (2.6.1.1) [Homo sapiens]	PF00155 gi 179104 gb AAA35 568.1	663.4 95%	2286 2370	1081 1081		
HMAFB84	1198479	37		blastx.2		1- AMINOCYCLOPROPAN E-CARBOXILATE SYNTHASE.	sp Q9W698 Q9W698	54%	770	1462		
HMAFB84	944629	666		HMMER 1.8 blastx.14		PFAM: Aminotransferases class-I (AF108420) 1- aminocyclopropane- carboxylate synthase [Fugu rubripes]	PF00155 gi 4426837 gb AAD2 0564.1	37.62 58% 43%	55 1 452	429 447 499		
HPTVF17	1150836	38		blastx.2		1- AMINOCYCLOPROPAN E-CARBOXILATE SYNTHASE.	sp Q9W698 Q9W698	57% 59%	188 574	565 759		
HPTVF17	936688	667		HMMER 1.8 blastx.2		PFAM: Aminotransferases class-I (AF108420) 1-	PF00155 gb AAD20564.1	37.58 52%	275 188	607 679		

HSDIC55	1197407	39	blastx.2	aminocyclopropane-carboxylate synthase [Fugu rubripes]	pir A00598 XNECD	96%	115	345
HSDIC55	506582	668	HMMER 1.8	aspartate transaminase (EC 2.6.1.1) - Escherichia coli	PF00155	97.17	106	363
HSDIL35	1228138	40	blastx.2	aspartate transaminase (EC 2.6.1.1) - Escherichia coli	pir A00598 XNECD	98%	2	226
HSDIL35	656370	669	HMMER 2.1.1	PFAM: Aminotransferases class-I	PF00155	195.1	3	371
HTXSM05	1104951	41	blastx.2	alanine transaminase (EC 2.6.1.2), cytosolic - human	pir A40465 A40465	67% 70%	5 456	406 515
HTXSM05	958447	670	HMMER 1.8 blastx.14	PFAM: Aminotransferases class-I alanine aminotransferase [Homo sapiens]	PF00155 gi 1507680 dbj BAA01186.1	38.39 66%	23 5	316 358
HYAAH23	1032585	42	blastx.2	GLYOXYLATE REDUCTASE (EC 1.1.1.79)	sp Q9UBQ7 Q9UBQ7	92%	1	606
HTPDIX13	1134372	43	blastx.2	CARBOXYPEPTIDASE X2.	sp O54860 O54860	88%	2	922
HTPDIX13	948419	671	HMMER 1.8 blastx.14	PFAM: Zinc carboxypeptidases (AF017639) carboxypeptidase X2 [Mus musculus]	PF00246 gi 2921092 gb AAC04670.1	87.75 88%	257 2	682 922

HAHHE43	1172244	44	blastx.2	NEURONAL THREAD PROTEIN AD7C-NTP.	sp O60448 O60448	41% 38% 48% 40% 38% 56% 41%	2538 2289 2186 2446 2510 1963 2541	1981 1927 1974 2273 2355 1889 2452
HAHHE43	966830	672	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	4.22	275	322
HAJAV28	948630	45	HMMER 2.1.1 blastx.2	PFAM: Actin	PF00022	35.9	120	230
				Uncharacterized hypothalamus protein HARP11.	sp AAF67655 AAF67 655	97%	96	458
HAPOR59	712955	46	HMMER 1.8 blastx.2	PFAM: Zinc-binding metalloprotease domain	PF00099	6.42	102	146
				CG5336 PROTEIN.	sp Q9VKB2 Q9VKB 2	40%	3	347
HBIBF78	772797	673	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	3.63	60	101
HCDAJ15	557243	674	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	3.61	68	88
HCE1S21	671209	49	HMMER 1.8 blastx.2	PFAM: Zinc-binding metalloprotease domain	PF00099	4.17	163	210
				hypothetical protein F55G1.5 - Caenorhabditis elegans	pir T29225 T29225	60% 43%	41 224	124 292
HCE3J64	951228	50	HMMER 2.1.1 blastx.2	PFAM: Peptidase family M13	PF01431	154.1	234	563
				ENDOTHELIN-	sp O60344 ECE2_HU	94%	3	599

				CONVERTING ENZYME 2 (EC 3.4.24.71) (ECE-2) 1	MAN	59%	557	688
HCFCV92	934216	675	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	3.55	542	571
HCFLI54	921382	52	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	6.41	457	504
HCFND04	1155680	53	blastx.2	hypothetical protein ZK328.4 - Caenorhabditis elegans	pir T29006 T29006	28%	187	1134
HCFND04	873441	676	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	5.29	834	881
HCHMV63	666798	677	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	5.78	86	133
HCWDL45	889416	55	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	4.63	121	168
HCWEI19	1125258	56	blastx.2	alcohol dehydrogenase (EC 1.1.1.1) C - Escherichia coli (isolate VU 3685)	pir S57525 S57525	93%	215	436
HCWEI19	948690	678	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	8.6	226	273
			blastx.14	formaldehyde dehydrogenase (glutathione) [Escherichia coli]	gi 887431 emb CAA5 2057.1	75%	300	10
HCWKB72	1224131	57	blastx.2	SER/ARG-RELATED NUCLEAR MATRIX PROTEIN.	sp O60585 O60585	67% 52% 100% 38%	2613 1482 2049 2637	2921 1808 2108 2744

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				blastx.14	(AE000733) queuine tRNA-ribosyltransferase [Aquifex aeolicus]	gi 2983726 gb AAC0 7288.1	35%	86	313
HDPXN01	915919	682		HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF000099	4.29	99	146
HDQFT77	1136137	63		blastx.2	KU70-BINDING PROTEIN (FRAGMENT).	sp Q9Y6H3 Q9Y6H3	95%	98	958
HDQFT77	932212	683		HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF000099	13.41	496	534
				blastx.14	(AF078164) Ku70- binding protein [Homo sapiens]	gi 4867999 gb AAD3 1085.1 AF078164_1	95%	13	873
HE2FR50	508498	64		HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF000099	3.68	137	166
				blastx.2	hypothetical protein DKFZp547N213.1 - human (fragment)	pir T50613 T50613	79%	122	355
HE2SN25	948687	684		HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF000099	9.04	227	268
HE8AE26	851514	685		HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF000099	5.8	49	75
HEBGK01	963673	67		HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF000099	4.13	426	391
				blastx.2	C380A1.2.1 (NOVEL PROTEIN (ISOFORM 1)).	sp Q9UJH9 Q9UJH9	81% 85% 100%	441 743 540	112 540 502
HEFMB30	691516	68		HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF000099	4.57	144	185
HEOPE58	851009	69		HMMER	PFAM: Zinc-binding	PF000099	5.32	320	364

HETBR74	948667	70	1.8 HMMER 2.1.1 blastx.2	metallopeptidase domain PFAM: Rhodanese-like domain	PF00581	32.2	321	461
HFCAG94	1111177	71	blastx.2	DUAL SPECIFICITY PROTEIN PHOSPHATASE 8 (EC 3.1.3.48) (EC 1 3.1.3.48)	sp O09112 DUS8_M OUSE	42% 54% 55%	291 458 535	476 523 588
HFCAG94	735763	686	HMMER 1.8	PFAM: Zinc-binding metallopeptidase domain	sp AAF69605 AAF69 605	66% 62%	860 1008	711 850
HFPHR82	957528	72	HMMER 2.1.1 blastx.2	PFAM: Actin	PF00022	91.7	1322	357
HHFOO84	857780	73	HMMER 1.8 blastx.2	Uncharacterized hypothalamus protein HARP11.	sp AAF67655 AAF67 655	100%	1523	273
HISAM68	1125189	74	HMMER 1.8 blastx.2	PFAM: Zinc-binding metallopeptidase domain	PF00099	4.21	141	161
HISAM68	868785	687	HMMER 1.8	CDNA FLJ20356 FIS, CLONE HEP15821.	sp BAA91112 BAA9 1112	100%	299	75
HLHDD45	942901	75	HMMER 1.8	PFAM: Zinc-binding metallopeptidase domain	PF00099	3.48	178	198
HMMAB49	1087684	76	HMMER 1.8 blastx.2	PFAM: Zinc-binding metallopeptidase domain	PF00099	5.88	177	218
HMMAB49	462502	688	HMMER 1.8	CDNA FLJ20378 FIS, CLONE KAIA0536.	sp BAA91131 BAA9 1131	60% 80%	678 464	466 402
HMSGO27	683031	77	HMMER 1.8 blastx.2	PFAM: Zinc-binding metallopeptidase domain Unnamed portein product.	PF00099 sp BAB01630 BAB0 1630	3.49 57% 68%	166 77 295	183 238 369

HMSGO27	943946	689	HMMER 2.1.1	PFAM: Reprolysin (M12B) family zinc metalloprotease	PF01421	59%	228	293
			blastx.2	(AF137335) metalloprotease disintegrin cysteine-rich protein, secreted form MDC-Ls [Homo sapiens]	gb AAD25100.1	92% 98% 35%	232 18 2	462 245 103
HNHAM52	457010	691	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	3.5	72	89
HNHEQ86	785580	79	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	3.9	7	48
HNHHF46	859822	692	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	5.55	3	35
HOECV83	653276	693	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	4.67	360	389
HORBO54	870674	82	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	5.64	277	300
HOSFZ73	913876	694	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	4.29	335	355
HPIAU71	1123830	84	blastx.2	ethanolamine ammonia- lyase (EC 4.3.1.7) heavy chain - Escherichia coli (strain K-12)	pir H65018 H65018	98% 79% 38%	400 104 578	68 3 516
HPIAU71	786811	695	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	3.49	265	291
HRDBT72	1112136	85	blastx.2	PRO1722.	sp AAF69605 AAF69 605	73% 75% 57%	821 673 609	666 614 532

HRDBT72	507847	696	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	7.31	295	324
HSDFT51	1124582	86	blastx.2	AMINOPEPTIDASE B (EC 3.4.11.6) (ARGINYL AMINOPEPTIDASE) 1	sp O09175 AMPB_R AT	33%	1291	872
HSDFT51	947918	697	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	6.14	328	363
HSDJM56	948669	87	blastx.14	aminopeptidase-B [Rattus norvegicus]	gi 1754515 dbj BAA1 3413.1	31% 36%	94 289	309 420
			HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	6.46	114	149
HSICX21	531267	88	blastx.2	formate C- acetyltransferase (EC 2.3.1.54) 1 - Escherichia coli	pir S01788 S01788	99% 99%	811 395	395 3
			HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	3.8	307	336
HSDS82	531248	89	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	5.91	206	238
HSNAH21	571314	90	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	7.14	91	135
HSODC08	966264	91	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	14.78	551	510
			blastx.2	BM-014.	sp AAF64270 AAF64 270	94%	779	222
HSPAB58	736098	92	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	4.6	39	86
HSQCM85	963554	93	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	5.37	187	231
HTOIA82	844319	94	HMMER	PFAM: Zinc-binding	PF00099	4.25	50	82

HUUDH57	931155	95	1.8	metallopeptidase domain	PF01433	378.5	23	661
			HMMER 2.1.1 blastx.2	PFAM: Peptidase family M1 ADIPOCYTE-DERIVED LEUCINE AMINOPEPTIDASE.				
HWACV74	1145916	96	blastx.2	CDNA FLJ20378 FIS, CLONE KALA0536.	sp BAA91131 BAA9 1131	52%	1731	1525
HWACV74	662347	698	HMMER 1.8	PFAM: Zinc-binding metallopeptidase domain	PF00099	4.43	198	242
HWAFW39	947915	97	HMMER 2.1.1 blastx.2	PFAM: Peptidase family M1 ADIPOCYTE-DERIVED LEUCINE AMINOPEPTIDASE.	PF01433	79.5	200	367
HWBBR65	1156447	98	blastx.2	NEURONAL THREAD PROTEIN AD7C-NTP.	sp Q9UKY2 Q9UKY 2	96%	200	367
					sp O60448 O60448	48%	1246	866
						63%	1150	971
						54%	703	539
						78%	791	708
						50%	791	618
						55%	1113	985
						38%	840	532
						48%	994	803
						62%	2216	2130
						37%	995	753
						60%	682	614
						34%	703	560
						63%	2241	2176
						57%	767	711
						84%	2215	2177

HWBBR65	747723	699	HMMER 1.8	PFAM: Zinc-binding metalloprotease domain	PF00099	32%	972	796
HWMES65	969190	99	HMMER 2.1.1	PFAM: Matrixin	PF00413	45.6	17	109
			blastx.2	HATCHING ENZYME PRECURSOR (EC 3.4.24.12) (HE) (HEZ) 1	sp P91953 HE_HEM PU	51%	2	304
HISBG28	920850	100	HMMER 2.1.1	PFAM: 3'5'-cyclic nucleotide phosphodiesterase	PF00233	195.7	187	789
			blastx.2	3',5'-cyclic-AMP phosphodiesterase (EC 3.1.4.-) - human (fragment)	pir A47286 A47286	90%	1	804
HAJAE60	786337	101	HMMER 2.1.1	PFAM: Aconitase family (aconitate hydratase)	PF00330	72.2	228	353
			blastx.2	ACONITATE HYDRATASE, MITOCHONDRIAL PRECURSOR (EC 4.2.1.3) (CITRATE HYDRO-LYASE) (ACONITASE).	sp Q99798 ACON_H UMAN	61%	15	353
HDPDE32	1217181	102	blastx.2	aconitate hydratase (EC	pir G64875 G64875	91%	69	887

HDPDE32	973342	700	HMMER 2.1.1	4.2.1.3) - Escherichia coli PFAM: Aconitase family (aconitate hydratase)	PF00330	260.7	219	569
HBDAC79	1199232	103	blastx.2	ACYL-COENZYME A DEHYDROGENASE-8 PRECURSOR (CDNA FLJ20352 FIS, CLONE HEP14524).	sp Q9UKU7 Q9UKU 7	86% 97% 45%	196 3 452	528 203 583
HBDAC79	935414	701	HMMER 2.1.1 blastx.14	PFAM: Acyl-CoA dehydrogenase (AL021958) fadE9 [Mycobacterium tuberculosis]	PF00441 gi 2911026 emb CAA 17519.1	102.6 62% 51% 64% 35%	94 250 348 6	342 255 384 422 89
HEMDX48	1163778	104	blastx.2	ACYL-COA DEHYDROGENASE; VERY-LONG-CHAIN SPECIFIC, 1	sp P50544 ACDV_M OUSE	48%	175	1917
HEMDX48	521844	702	HMMER 1.8	PFAM: Acyl-CoA dehydrogenases	PF00441	115.91	4	321
HHASB48	721150	105	HMMER 2.1.1 blastx.2	PFAM: Acyl-CoA dehydrogenase ACYL-COA DEHYDROGENASE, VERY-LONG-CHAIN SPECIFIC, 1	PF00441 sp P50544 ACDV_M OUSE	101.3 54%	319 175	645 648
HLWCA17	1104762	106	blastx.2	probable acyl-CoA dehydrogenase PA2550 [imported] - Pseudomonas aeruginosa (strain PAO1)	pir D83326 D83326	62%	359	979

HLWCA17	957664	703	HMMER 1.8	PFAM: Acyl-CoA dehydrogenases	PF00441	52.61	521	892
			blastx.14	(AL096811) putative acyl-CoA dehydrogenase [Streptomyces coelicolor A3(2)]	gi 5441764 emb CAB46788.1	53% 58%	521 286	904 519
HNTTD09	1104487	107	blastx.2	K09H11.1 PROTEIN.	sp O01590 O01590	47% 32%	179 6	832 152
HNTTD09	676665	704	HMMER 1.8	PFAM: Acyl-CoA dehydrogenases	PF00441	49.76	60	425
HSKDT07	927823	108	HMMER 1.8	PFAM: Acyl-CoA dehydrogenases	PF00441	122.42	13	369
			blastx.2	ACYL-COA DEHYDROGENASE, VERY-LONG-CHAIN SPECIFIC, 1	sp P50544 ACDV_M OUSE	38%	7	906
HSRDB26	1102231	109	blastx.2	acyl CoA dehydrogenase homolog - Escherichia coli	pir J41124 J41124	99% 72% 81%	305 27 2	658 305 34
HSRDB26	525475	705	HMMER 2.1.1	PFAM: Acyl-CoA dehydrogenase	PF00441	115.7	21	290
HAPBS07	967325	110	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106	50.05	61	267
			blastx.2	RETINOL DEHYDROGENASE HOMOLOG.	sp Q9Y2P9 Q9Y2P9	75% 69% 62% 34%	317 61 580 561	682 306 708 683
HAUAI17	921674	111	HMMER 2.1.1	PFAM: short chain dehydrogenase	PF00106	198.7	172	687

HBCBT19	959953	112	blastx.2	RETINAL SHORT-CHAIN DEHYDROGENASE/REDUCTASE RETSDR3. PFAM: short chain dehydrogenase	sp Q9UKU3 Q9UKU3	81% 100%	145 687	687 857
HBCPT10	957631	113	HMMER 2.1.1	PFAM: short chain dehydrogenase	PF00106	30.7	202	417
			blastx.2	hypothetical protein F17A8.100 - Arabidopsis thaliana	pir T04022 T04022	40% 41% 52%	214 38 591	552 196 653
			HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106	98.87	338	673
HBGDA14	866258	114	blastx.2	CDNA FLJ11008 FIS, CLONE PLACE1003100, MODERATELY SIMILAR 1	sp BAA91953 BAA91953	97% 80%	263 671	670 838
			HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106	127.15	3	299
			blastx.2	2,3-dihydro-2,3-dihydroxybenzoate dehydrogenase (EC 1.3.1.28) - Escherichia coli	pir A91904 DEECDB	92%	3	482
HCHNJ32	934848	115	HMMER 2.1.1	PFAM: short chain dehydrogenase	PF00106	213.6	54	587
			blastx.2	CARBONYL REDUCTASE.	sp Q9UHY9 Q9UHY9	95%	33	764
HCHON59	931082	116	HMMER 2.1.1	PFAM: SCP-2 sterol transfer family	PF02036	96.3	1006	1335

				blastx.2	CG5590 PROTEIN.	sp Q9VB10 Q9VB10	47% 68%	538 99	1344 536
HCUGN19	716989	117	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106		8.05	98	151
HCUGR38	706471	118	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106		73.02	102	284
			blastx.2	Putative oxidoreductase.	sp CAB94622 CAB9 4622		55% 30%	105 4	296 81
HDPND85	852628	119	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106		191.2	113	709
			blastx.2	CG9360 PROTEIN.	sp Q9VYU9 Q9VYU 9		42%	113	841
HDPRN38	883658	120	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106		175.59	123	680
			blastx.2	Peroxisomal trans 2-enoyl CoA reductase (EC 1.3.1.8).	sp AAF69798 AAF69 798		81% 84%	111 61	824 138
HE8AM92	952610	121	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106		8.98	202	330
			blastx.2	DTDP-4-KETO-6- DEOXY-D-GLUCOSE 4- REDUCTASE.	sp Q9UJ54 Q9UJ54		90%	208	654
HE9RE21	888243	122	HMMER 2.1.1	PFAM: short chain dehydrogenase	PF00106		81.3	96	386
			blastx.2	ESTRADIOL 17 BETA-	sp P56937 DHB7_H		100%	90	419

HETKH30	884009	123		DEHYDROGENASE 7 (EC 1.1.1.62) 1	UMAN	88%	421	522
			HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106	137.09	300	881
			blastx.2	PUTATIVE STEROID DEHYDROGENASE SPM2 (EC 1.1.1.-).	sp O57314 DHBX_A NAPL	54%	294	866
HHAME78	840939	124	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106	55.01	60	260
			blastx.2	CARBONYL REDUCTASE.	sp Q9UHY9 Q9UHY 9	83% 100% 95% 81%	48 322 257 2	260 426 322 67
					PF00106	11.34	109	285
HKABI68	856590	125	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106			
			blastx.2	HSCARG.	sp AAG09721 AAG0 9721	99% 75%	139 456	441 551
					PF00106	100.69	23	361
HKMLN95	914083	126	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106			
			blastx.2	STEROID DEHYDROGENASE HOMOLOG.	sp Q9Y6G8 Q9Y6G8	98%	20	583
HMCFA91	959954	127	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106	25.77	19	282
			blastx.2	hypothetical protein	pir T04022 T04022	53%	367	648

HNTBF75	836701	128	HMMER 2.1.1 blastx.2	F17A8.100 - Arabidopsis thaliana PFAM: short chain dehydrogenase STEROID DEHYDROGENASE HOMOLOG.	PF00106 sp Q9Y6G8 Q9Y6G8	41%	1	282
HPTGB43	726460	129	HMMER 2.1.1 blastx.2	PFAM: short chain dehydrogenase CARBONYL REDUCTASE.	PF00106 sp Q9UHY9 Q9UHY 9	45.1 73%	84 87	191 374
HPTVL90	509487	130	HMMER 2.1.1 blastx.2	PFAM: short chain dehydrogenase RETINAL SHORT- CHAIN DEHYDROGENASE/RE DUCTASE RETSDR3.	PF00106 sp Q9UKU3 Q9UKU 3	46.3 76%	11 8	115 319
HSKIA89	837986	131	HMMER 1.8 blastx.2	PFAM: Alcohol/other dehydrogenases, short chain type hypothetical protein T11F9.11 - Caenorhabditis elegans	PF00106 pir T24832 T24832	17.7 42% 53% 35%	359 329 123 737	478 619 320 820
HTXGF27	695766	132	HMMER 2.1.1 blastx.2	PFAM: short chain dehydrogenase hypothetical protein DKFZp566O084.1 - human	PF00106 pir T17307 T17307	208.7 93% 100%	193 70 38	765 1011 73
HWHHW54	684125	133	HMMER 2.1.1	PFAM: short chain dehydrogenase	PF00106	59.1	871	1002

			blastx.2	Oxidoreductase UCPA.	sp AAF80754 AAF80754	77%	871	1059
HWHPO29	857383	134	HMMER 2.1.1	PFAM: short chain dehydrogenase	PF00106	101.3	257	664
			blastx.2	CGI-82 PROTEIN.	sp Q9Y391 Q9Y391	74% 64%	257 186	664 260
HWLPR94	967326	135	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106	44.2	193	417
			blastx.2	RETINOL DEHYDROGENASE HOMOLOG.	sp Q9Y2P9 Q9Y2P9	95% 84%	184 36	450 134
HWLUL28	925331	136	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106	113.24	163	588
			blastx.2	C359F1.1 (novel protein (ortholog of mouse and rat 1	sp CAB92744 CAB92744	82%	97	735
HWLXT48	957630	137	HMMER 1.8	PFAM: Alcohol/other dehydrogenases, short chain type	PF00106	46.57	133	306
			blastx.2	CDNA FLJ11008 FIS, CLONE PLACE1003100, MODERATELY SIMILAR 1	sp BAA91953 BAA91953	83% 94%	58 309	333 359
HBGMD15	1103922	138	blastx.2	L-threonine 3-dehydrogenase (EC 1.1.1.103) - Escherichia coli	pir A33276 DEECTH	91% 79%	64 554	564 655
			HMMER	PFAM: Zinc-binding	PF00107	141.1	3	323
HBGMD15	786307	706						

HNGMA91	789744	139	2.1.1 HMMER 1.8 blastx.2	dehydrogenases PFAM: Zinc-binding dehydrogenases	PF00107	28.74	76	231
HSLIE57	1103672	140	blastx.2	probable alcohol dehydrogenase (EC 1.1.1.1) ybdR - Escherichia coli	pir F64794 F64794	92%	76	318
HSLFE21	1103524	141	blastx.2	probable oxidoreductase (EC 1.1.1.-) ycjQ - Escherichia coli	pir D64880 D64880	95%	2	994
HSLIE40	1105422	142	blastx.2	probable alcohol dehydrogenase (EC 1.1.1.1) ybdR - Escherichia coli	pir F64794 F64794	97%	88	510
HTXHA35	1152110	143	blastx.2	CGI-63 PROTEIN.	sp Q9Y373 Q9Y373	98% 72%	309 14	836 190
HAJCS07	1105538	144	blastx.2	ALDO-KETO REDUCTASE.	sp O09125 O09125	75% 75% 63%	193 535 733	480 738 798

HAICS07	953351	711	HMMER 2.1.1 blastx.14	PFAM: Aldo/keto reductase family aldo-keto reductase [Mus musculus]	PF00248	283	193	480
					gi 1698718 gb AAB3 7274.1	76% 75% 91%	193 535 733	480 738 768
HBKDN33	1167313	145	blastx.2	Acetyl-CoA synthetase.	sp AAF75064 AAF75 064	85% 85%	2 955	1015 1014
HBKDN33	922414	712	HMMER 2.1.1 blastx.14	PFAM: AMP-binding enzyme acetyl-CoA synthetase [Drosophila melanogaster]	PF00501	249.5	2	931
					gi 608694 emb CAA8 6738.1	65%	2	1222
HBODH62	1228278	146	blastx.2	DJ568C11.3 (novel AMP- binding enzyme similar to 1	sp CAB75500 CAB7 5500	98% 100%	344 297	1696 362
HBODH62	742827	713	HMMER 1.8 blastx.2	PFAM: AMP-binding enzymes	PF00501	43.02	27	158
HCEPJ44	1157810	147		Sequence 17 from Patent WO951740.	sp CAC07591 CAC0 7591	99%	2	571
HCEPJ44	930790	714	HMMER 1.8 blastx.14	PFAM: AMP-binding enzymes (AF023258) fatty acid transport protein [Mus musculus]	PF00501	19.17	3	215
					gi 2612939 gb AAC6 9640.1	90%	9	536
HCWCM65	1105668	148	blastx.2	probable non-ribosomal peptide synthetase PA2402 [imported] - Pseudomonas aeruginosa (strain PAO1)	pir F83345 F83345	75% 74% 37% 31% 57% 53%	12 12 9 9 595 595	611 611 605 596 678 678
HCWCM65	529230	715	HMMER	PFAM: AMP-binding	PF00501	69.62	31	264

HDQDY52	1182322	149	1.8 blastx.2	enzymes DJ18C9.1 (SIMILAR TO ACETYL-COENZYM A SYNTHETASE) 1	sp Q9UJ15 Q9UJ15	84%	85	690
HDQDY52	852622	716	HMMER 1.8 blastx.2	PFAM: AMP-binding enzymes (AL049709) dJ18C9.1 (similar to acetyl- coenzyme A synthetase) [Homo sapiens]	PF00501 emb CAB61786.1	82.8	316	555
HEEAA32	1203140	150	blastx.2	CDNA FLJ20581 FIS, CLONE REC00491.	sp BAA91273 BAA9 1273	93% 97% 57%	502 3 1146	1182 500 1208
HEEAA32	887490	717	HMMER 1.8	PFAM: AMP-binding enzymes	PF00501	35.92	39	407
HEGAN70	839719	151	HMMER 1.8 blastx.2	PFAM: AMP-binding enzymes Hypothetical 179.7 kDa protein.	PF00501 sp AAF64300 AAF64 300	18.6	334	516
HFKMF42	1104119	152	blastx.2	Long-chain-fatty-acid- CoA ligase-like protein.	sp BAB02683 BAB0 2683	61% 85% 34% 54%	124 31 295 748	654 111 579 846
HFKMF42	923824	718	HMMER 1.8 blastx.14	PFAM: AMP-binding enzymes 4-coumarate-coA ligase [Mycobacterium leprae]	PF00501 gi 699196 gb AAA62 961.1	48% 41% 91.1	656 65 86	1096 556 901
						51% 48% 55% 36% 50%	764 647 365 968 491	949 781 484 1099 568

HFPHG06	1104964	153	blastx.2	enterobactin synthetase component F - Escherichia coli	pir H64791 YGECEF	53% 44%	65 570	103 623
HFPHG06	933802	719	HMMER 2.1.1 blastx.14	PFAM: AMP-binding enzyme enterobactin [Escherichia coli]	PF00501 gi 145843 gb AAA92015.1	66 90%	53 2	232 220
HHEMB89	1227613	154	blastx.2	DJ568C11.3 (novel AMP-binding enzyme similar to 1	sp CAB75500 CAB75500	99%	561	1961
HHEMB89	574897	720	HMMER 2.1.1	PFAM: AMP-binding enzyme	PF00501	115.4	1	453
HLDPC46	466567	155	HMMER 1.8 blastx.2	PFAM: AMP-binding enzymes CDNA FLJ20581 FIS, CLONE REC00491.	PF00501 sp BAA91273 BAA91273	103.84 89% 57%	17 586	481 571 681
HLDRG44	1106225	156	blastx.2	KIDNEY-SPECIFIC PROTEIN.	sp O70490 O70490	74%	16	1011
HLDRG44	969544	721	HMMER 1.8 blastx.14	PFAM: AMP-binding enzymes (AF062389) kidney-specific protein [Rattus norvegicus]	PF00501 gi 3127193 gb AAD05209.1	104.64 78%	89 2	694 931
HLICR73	1107517	157	blastx.2	VERY LONG-CHAIN ACYL-COA SYNTHETASE HOMOLOG 2.	sp Q9Y2P5 Q9Y2P5	96%	9	536
HLICR73	837030	722	HMMER	PFAM: AMP-binding	PF00501	20.33	19	324

			enzymes	(AF064255) very long-chain acyl-CoA synthetase homolog 2; VLCS-H2 [Homo sapiens]	gb AAD29444.1 AF064255_1	99% 100%	1 450	441 497
HNHOP64	1103943	158	blastx.2	FATTY ACID TRANSPORT PROTEIN.	sp O95186 O95186	90% 52%	515 57	57 1
HNHOP64	966754	723	HMMER 1.8 blastx.14	Pfam: AMP-binding enzymes	PF00501	23.65	539	757
				(AF055899) fatty acid transport protein [Homo sapiens]	gi 4206376 gb AAD11623.1	88% 52%	374 835	835 891
HSDEF56	1128288	159	blastx.2	acetate--CoA ligase (EC 6.2.1.1) - Escherichia coli	pirlD65215 D65215	97% 95% 100%	106 707 897	729 892 986
HSDEF56	496551	724	HMMER 2.1.1	Pfam: AMP-binding enzyme	PF00501	175.3	2	436
HTENI29	1105518	160	blastx.2	LONG-CHAIN ACYL-COA SYNTHETASE 5	sp Q9UKU0 Q9UKU0	97%	24	1172
HTENI29	954519	725	HMMER 1.8 blastx.14	Pfam: AMP-binding enzymes	PF00501	65	366	845
				(AF129166) long-chain acyl-CoA synthetase 5 [Homo sapiens]	gi 5702202 gb AAD47199.1 AF129166_1	98%	51	1172
HWMKD72	1106729	161	blastx.2	agmatinase PA1421 [imported] - Pseudomonas aeruginosa (strain PAO1)	pirlH83468 H83468	64%	2	643
HWMKD72	970613	726	HMMER 2.1.1 blastx.14	Pfam: Arginase family	PF00491	179.6	11	565
				agmatine ureohydrolase	gi 882466 gb AAA69	48%	302	625

HAPSQ21	972037	162	HMMER 2.1.1 blastx.2	[Escherichia coli] PFAM: Eukaryotic aspartyl protease NAPSIN 1 PRECURSOR (EC 3.4.23.-) (NAPSIN A) (NAPA) 1	104.1 PF00026 sp O96009 NAP1_H UMAN	50% 44% 274.4	14 164 211	166 271 735
HLJDW02	1192885	163	blastx.2	NAPSIN 1 PRECURSOR (EC 3.4.23.-) (NAPSIN A) (NAPA) 1	sp O96009 NAP1_H UMAN	100% 90%	58 767	762 865
HLJDW02	837592	727	HMMER 2.1.1 blastx.2	PFAM: Eukaryotic aspartyl protease (AF090386) napsin A [Homo sapiens]	PF00026 gb AAD04917.1	134.5 100% 65%	65 47 433	412 433 534
HMGBT01	1205666	164	blastx.2	aspartic proteinase (EC 3.4.23.-) BACE precursor - human	pir A59090 A59090	100% 85%	3 1705	1073 1992
HMGBT01	879904	728	HMMER 1.8 blastx.2	PFAM: Eukaryotic aspartyl proteases aspartic proteinase (EC 3.4.23.-) BACE precursor - human	PF00026 pir A59090 A59090	31.46 100% 85%	3 8 1714	362 1081 2001
HSSJJ24	1178041	165	HMMER 1.8 blastx.2	PFAM: Eukaryotic aspartyl proteases carbonic anhydrase	PF00026 PF00194	26.48 101.7	33 78	113 266
HFTCG46	669383	166	HMMER 2.1.1 blastx.2	CARBONIC ANHYDRASE VB, MITOCHONDRIAL PRECURSOR (EC 1	sp Q9Y2D0 CA5B_H UMAN	98%	78	257

HNTMD81	929511	167	HMMER 2.1.1 blastx.2	PFAM: Eukaryotic-type carbonic anhydrase	PF00194	84.3	16	249
				CARBONIC ANHYDRASE XIV PRECURSOR (EC 4.2.1.1) (CARBONATE 1	sp Q9ULX7 CAHE_ HUMAN	69% 69% 90%	19 135 434	369 437 499
HBSAJ60	1174334	168	blastx.2	OUTER MEMBRANE USHER PROTEIN PMFC PRECURSOR.	sp Q9R7S7 Q9R7S7	99% 97%	2043 2888	2885 3331
HBSAJ60	573965	730	HMMER 2.1.1	PFAM: Citrate synthase	PF00285	192	2	265
HSKCI43	506599	169	HMMER 1.8 blastx.2	PFAM: Citrate synthase	PF00285	69.36	1	315
				citrate (si)-synthase (EC 4.1.3.7) - Escherichia coli	pir G64807 YKEC	64% 96%	1 168	345 260
HSDKE47	1128095	170	blastx.2	NADH dehydrogenase (ubiquinone) (EC 1.6.5.3) chain NDUFS2 precursor - human	pir JE0193 JE0193	100%	73	195
HSDKE47	764970	731	HMMER 2.1.1	PFAM: Respiratory-chain NADH dehydrogenase, 49 Kd subunit	PF00346	79.8	64	195
HCWTB56	1172460	171	blastx.2	probable cation- transporting P-type ATPase PA2435 [imported] - Pseudomonas aeruginosa (strain PAOI)	pir F83342 F83342	65% 95%	2 270	268 332
HCWTB56	853009	732	HMMER 1.8 blastx.2	PFAM: E1-E2 ATPases	PF00122	55.15	2	301
				cadmium resistance	gb AAB37345.1	42%	2	316

HFPBS73	1144027	172	blastx.2	protein [Lactococcus lactis] H+/K+-exchanging ATPase (EC 3.6.1.36) chain B [validated] - Escherichia coli	pir H64804 PWECK	81%	373	1122
HFPBS73	954892	733	HMMER 2.1.1 blastx.2	PFAM: E1-E2 ATPase kdpB [Escherichia coli]	PF00122 gb AAB96336.1	196.5 100% 100%	3 580	572 563 603
HOEDD44	954893	173	HMMER 2.1.1 blastx.2	PFAM: E1-E2 ATPase H+/K+-exchanging ATPase (EC 3.6.1.36) chain B [validated] - Escherichia coli	PF00122 pir H64804 PWECK	173.2 92% 96% 39%	53 634 513	574 574 723 635
HSUAN33	956315	174	HMMER 1.8 blastx.2	PFAM: E1-E2 ATPases Hypothetical 128.8 kDa protein.	PF00122 sp CAB89728 CAB89728	46.29 48% 35%	1317 1596 693	907 766 256
HBCMD49	1206021	175	blastx.2	hypothetical protein F38H4.8 - Caenorhabditis elegans	pir T21981 T21981	44%	46	357
HBCMD49	865314	734	HMMER 2.1.1 blastx.2	PFAM: Enoyl-CoA hydratase/isomerase family (AE000989) enoyl-CoA hydratase (fad-4) [Archaeoglobus fulgidus]	PF00378 gb AAB89601.1	74.6 39%	263 197	550 619
HKABN12	956826	176	HMMER	PFAM: Enoyl-CoA	PF00378	31.8	900	820

			2.1.1	hydratase/isomerase family					
			blastx.2	CG6984 PROTEIN.	sp Q9V7Y3 Q9V7Y3	37% 41%	745 891	593 739	
HMOAC31	1228291	177	blastx.2	probable 3-hydroxybutyryl-CoA dehydrogenase (EC 1.1.1.157) ydbU - Escherichia coli (strain K-12)	pir F64890 F64890	93%	1297	2586	
HMOAC31	920386	735	HMMER 2.1.1	PFAM: Enoyl-CoA hydratase/isomerase family	PF00378	159.1	5	268	
			blastx.14	enoyl-CoA hydratase [Escherichia coli]	gi 2764828 emb CAA66095.1	88% 90%	2 334	355 495	
HMVVBQ92	1204710	178	blastx.2	CDNA FLJ10948 FIS, CLONE PLACE1000142, WEAKLY SIMILAR TO 1	sp BAA91922 BAA91922	99%	1701	2090	
HMVVBQ92	791284	736	HMMER 1.8	PFAM: Enoyl-CoA hydratase/isomerase	PF00378	32.87	167	274	
HOELA62	1228151	179	blastx.2	CDNA FLJ10948 FIS, CLONE PLACE1000142, WEAKLY SIMILAR TO 1	sp BAA91922 BAA91922	98%	1685	2074	
HOELA62	863712	737	HMMER 2.1.1	PFAM: Enoyl-CoA hydratase/isomerase family	PF00378	39.5	1635	1757	
HSSGE35	1228152	180	blastx.2	CDNA FLJ10948 FIS, CLONE PLACE1000142,	sp BAA91922 BAA91922	89%	97	498	

					WEAKLY SIMILAR TO 1						
HSSGE35	967832	738	HMMER 1.8	PFAM: Enoyl-CoA hydratase/isomerase	PF00378	39.59	70	210			
			blastx.14	AU-binding protein/Enoyl-CoA hydratase [Homo sapiens]	gi 780241 emb CAA5 6260.1	57% 55% 69%	88 1 363	357 87 401			
HEMFJ74	1216651	181	blastx.2	GLUCOSAMINE-- FRUCTOSE-6- PHOSPHATE AMINOTRANSFERASE 1 1	sp O94808 GFA2_H UMAN	100% 98%	193 1301	1299 1468			
HEMFJ74	523350	739	HMMER 2.1.1	PFAM: Glutamine amidotransferases class-II	PF00310	74.1	124	348			
HISCL24	676997	182	HMMER 2.1.1	PFAM: Glutamine amidotransferases class-II	PF00310	92.7	3	233			
			blastx.2	GLUCOSAMINE-- FRUCTOSE-6- PHOSPHATE AMINOTRANSFERASE 1 1	sp O94808 GFA2_H UMAN	85%	3	560			
H7PBB83	1228150	183	blastx.2	CG9630 PROTEIN.	sp Q9VHU1 Q9VHU 1	47% 56% 25%	145 955 776	774 1044 871			
H7PBB83	908235	740	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	84.64	756	586			
			blastx.14	(AJ010469) RNA helicase [Arabidopsis thaliana]	gi 3776011 emb CAA 09208.1	54% 49%	756 516	514 310			
HAGBA63	1122199	184	blastx.2	PUTATIVE ATP-	sp O43630 O43630	99%	1121	78			

HIAGBA63	509775	741	HMMER 1.8	DEPENDENT MITOCHONDRIAL RNA HELICASE. PFAM: Helicases conserved C-terminal domain	PF00271	7.62	2	124
HBMUG47	1102698	185	blastx.2	RECQ HELICASE 5 (DNA HELICASE RECQ5 GAMMA).	sp Q9UNC8 Q9UNC8	98%	21	530
HBMUG47	863846	742	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	52.06	22	204
HCRPZ84	1130816	186	blastx.2	RNA helicase.	sp AAG09428 AAG09428	37% 25% 34% 40%	3 1469 1161 834	893 1942 1640 1013
HCRPZ84	965476	743	HMMER 1.8 blastx.14	PFAM: Helicases conserved C-terminal domain (AF038963) RNA helicase [Homo sapiens]	PF00271 gi 4405795 gb AAD19826.1	13.09	923	1063
HCRPZ84	965476	743	HMMER 1.8 blastx.14	PFAM: Helicases conserved C-terminal domain (AF038963) RNA helicase [Homo sapiens]	PF00271 gi 4405795 gb AAD19826.1	45% 43% 59% 50% 56% 45% 30% 44%	137 506 26 1063 413 863 737 1154	373 622 91 1140 460 934 853 1228
HCWTR54	1192287	187	blastx.2	NEURONAL THREAD PROTEIN AD7C-NTP.	sp O60448 O60448	64% 69% 48%	304 245 313	179 120 233

HCWTR54	729290	744	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	27% 85%	331 364	233 344
HDPBB41	1195686	188	blastx.2	RNA helicase HEL117 - rat	pir A57514 A57514	90% 88% 45%	2411 2722 2814	564 2372 2545
HDPBB41	925800	745	HMMER 2.1.1	PFAM: Helicases conserved C-terminal domain	PF00271	108.7	47	292
HEOPI32	907903	189	blastx.14 HMMER 1.8	(AF106680) RNA helicase [Homo sapiens] PFAM: Helicases conserved C-terminal domain	gi 5410326 gb AAD4 3033.1 PF00271	82% 89.44	17 176	637 430
HFSAG03	1151479	190	blastx.2	DJ620E11.1A (NOVEL HELICASE C- TERMINAL DOMAIN AND SNF2 1 1 PRO0478.	sp Q9UIF0 Q9UIF0	87%	2	661
HFSAG03	960973	746	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	sp Q9UI59 Q9UI59 PF00271	67% 6.39	967 454	1086 365
HFXCI24	1182719	191	blastx.2	probable ATP-dependent RNA helicase rhIE - Escherichia coli	pir E64816 E64816	81%	12	674
HFXCI24	908374	747	HMMER 2.1.1	PFAM: Helicases conserved C-terminal domain	PF00271	128.5	151	396

			blastx.14	Putative ATP-dependent RNA helicase RhlE. [Escherichia coli]	gi 4062355 dbj BAA35457.1	94% 100%	1 644	543 664
HFXHRJ89	907938	192	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	88.81	216	470
			blastx.2	DJ620E11.1A (NOVEL HELICASE C-TERMINAL DOMAIN AND SNF2 1 1	sp Q9UJF0 Q9UJF0	98% 78% 48%	210 37 5	881 207 85
HHPTC55	1106390	193	blastx.2	hypothetical protein C27B7.4 - Caenorhabditis elegans	pir T19508 T19508	47%	2	541
HHPTC55	907951	748	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	61.91	13	243
			blastx.14	(AF026032) ATRX protein [Mus musculus]	gi 3002558 gb AAC08741.1	54%	4	351
HJBBS54	1195070	194	blastx.2	DJ616B8.1 (RNA HELICASE) (Fragment).	sp CAC03449 CAC03449	89%	3	551
HJBBS54	869621	749	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	10.61	3	170
			blastx.2	(AC005314) putative pre-mRNA splicing factor RNA helicase [Arabidopsis thaliana]	gb AAC36188.1	54%	3	563
HKAHB56	1162649	195	blastx.2	RNA helicase.	sp AAG09428 AAG09428	28% 31% 33%	833 333 54	1606 824 389

HKAHB56	865298	750	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	63.37	699	986
HLDCI35	1151490	196	blastx.2	APOBEC-1 stimulating protein.	sp CAB94754 CAB9 4754	83%	84	725
HLDCI35	831356	751	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	6.01	288	374
			blastx.2	(AF209192) Apobec-1 complementation factor [Homo 1]	gb AAF34824.1 AF2 09192_1	94%	177	725
HMCBU79	1165318	197	blastx.2	CDNA FLJ20110 FIS, CLONE COL05103.	sp BAA90955 BAA9 0955	89%	1	987
HMCBU79	856630	752	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	17.95	349	459
HNTRV07	1199546	198	blastx.2	Cytoplasmic dynein heavy chain.	sp BAA97048 BAA9 7048	92% 91% 40%	934 18 48	2001 923 152
HNTRV07	952794	753	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	6.41	274	345
			blastx.14	similar to dynein heavy chain; cDNA EST EMBL:D27549.1 [Caenorhabditis elegans]	gi 3876099 emb CAA 99830.1	33%	46	333
HODEX10	926260	754	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	9.2	22	54
HOGAQ10	1222600	200	blastx.2	Proliferation-associated	sp AAF82262 AAF82	99%	1045	1992

HOGAQ10	907911	755	HMMER 1.8	SNF2-like protein. PFAM: Helicases conserved C-terminal domain	262 PF00271	94%	98	1051
			blastx.14	lymphocyte specific helicase [Mus musculus]	gi 805296 gb AAB08 015.1	93% 83%	80 18	556 71
HOSBW20	985056	201	blastx.2	CG7972 PROTEIN.	sp Q9VSE2 Q9VSE2	47%	4	777
HOSBW20	668774	756	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	13.94	58	96
HRADL60	1151310	202	blastx.2	probable pre-mRNA splicing factor ATP- dependent RNA helicase - fission yeast (Schizosaccharomyces pombe)	pir T37496 T37496	40% 42%	2750 2750	1416 1737
HRADL60	967578	757	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	14.84	248	496
			blastx.2	(AL009197) putative pre- mRNA splicing factor ATP-dependent RNA helicase [Schizosaccharomyces pombe]	emb CAA15715.1	40% 44%	83 83	1429 1096
HSGSC29	1150837	203	blastx.2	ACTIN INTERACTING PROTEIN.	sp O23240 O23240	56%	334	750
HSGSC29	953599	758	HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	9.31	345	446

				blastx.14	actin interacting protein [Arabidopsis thaliana]	gi 4006920 emb CAB 16815.1	53%	468	740
HTEDX38	1106208	204		blastx.2	DEAD-BOX PROTEIN.	sp Q9Y659 Q9Y659	70%	333	452
HTEDX38	920697	759		HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	90%	55	1494
							70.92	3	176
HTEJE15	1102531	205		blastx.14	(AF106019) DEAD-box protein [Homo sapiens]	gi 5359631 gb AAD4 2744.1 AF106019_1	90%	3	1436
				blastx.2	VASA protein.	sp AAF72705 AAF72 705	100%	1	405
HTEJE15	908360	760		HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	14.92	5	52
				blastx.14	vasa-like gene protein, RVLG protein=putative DEAD 1 [Rattus sp.]	gi 806464 gb AAB33 364.1	73%	2	190
							84%	242	319
							65%	188	265
HTOES03	1150877	206		blastx.2	TRANSCRIPTIONAL ACTIVATOR SRCAP.	sp Q9Y5L9 Q9Y5L9	40%	203	1186
HTOES03	955814	761		HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	53.97	240	491
				blastx.14	(AF143946) transcriptional activator SRCAP [Homo sapiens]	gi 5106572 gb AAD3 9760.1 AF143946_1	50%	6	569
							39%	906	1019
							33%	540	656
HTOHS18	1193057	207		blastx.2	ATP-DEPENDENT RNA HELICASE.	sp Q9SHB9 Q9SHB9	39%	39	857
HTOHS18	908347	762		HMMER 1.8	PFAM: Helicases conserved C-terminal domain	PF00271	104.65	158	370
				blastx.14	(AC007660) putative	gi 4895231 gb AAD3	45%	23	439

HWAAAX38	943936	208	HMMER 1.8	RNA helicase [Arabidopsis thaliana] PFAM: Helicases conserved C-terminal domain	2817.1 AC007660_18 PF00271	47%	579	761
			blastx.2	PUTATIVE SNF2/SWI2 FAMILY TRANSCRIPTION FACTOR.	sp Q9SHB2 Q9SHB2	46%	39	380
HMSFN70	1210794	209	blastx.2	CDNA FLJ20421 FIS, CLONE KAT02467.	sp BAA91158 BAA9 1158	96%	1	921
HMSFN70	921879	763	HMMER 2.1.1	PFAM: Inositol monophosphate family	PF00459	40.2	703	795
			blastx.14	(AL032655) predicted using Genefinder; similar to 1 this gene [Caenorhabditis elegans]	gi 3881275 emb CAA 21725.1	43% 52% 48% 24%	328 703 556 25	492 822 678 273
HUSGB93	1224029	210	blastx.2	BISPHOSPHATE 3'- NUCLEOTIDASE.	sp O95861 O95861	99% 100%	426 146	953 364
HUSGB93	923014	764	HMMER 1.8	PFAM: Inositol monophosphate family	PF00459	33.91	125	388
			blastx.14	(AF125042) bisphosphate 3-nucleotidase [Homo sapiens]	gi 4325316 gb AAD1 7329.1	100%	17	493
HELHL56	1164004	211	blastx.2	CDNA FLJ11068 FIS, CLONE PLACE1004918, WEAKLY SIMILAR TO 1	sp BAA91985 BAA9 1985	99%	8	655
HELHL56	578441	765	HMMER 1.8	PFAM: L-lactate dehydrogenases	PF00056	33.17	80	211

HOENY85	1191756	212	blastx.2	CDNA FLJ11068 FIS, CLONE PLACE1004918, WEAKLY SIMILAR TO 1	sp BAA91985 BAA9 1985	93%	53	1069
HOENY85	875830	766	HMMER 1.8	PFAM: L-lactate dehydrogenases	PF00056	144.25	38	598
HTEHI14	1102680	213	blastx.2	LACTATE DEHYDROGENASE A (EC 1.1.1.27).	sp Q9XT87 Q9XT87	68%	218	523
HTEHI14	526687	767	HMMER 2.1.1	PFAM: lactate/malate dehydrogenase	PF00056	50.6	222	371
HETDT70	1228235	214	blastx.2	NMD PROTEIN.	sp O95991 O95991	99% 52%	25 540	558 596
HETDT70	937999	768	HMMER 2.1.1	PFAM: Lipase	PF00151	125.4	139	528
			blastx.2	similar to the following EST sequences: GenBank Accession 1 sapiens]	gb AAC99994.1	88% 52%	25 539	597 595
HPIAT34	936262	215	HMMER 2.1.1	PFAM: Lipase	PF00151	123.9	305	535
			blastx.2	NMD PROTEIN.	sp O95991 O95991	80% 100% 92% 66%	266 84 12 277	574 275 95 330
HDPP041	1204324	216	blastx.2	malate dehydrogenase (NAD+) (EC 1.1.1.-) precursor, mitochondrial - human	pir A39503 A39503	98%	186	1937
HDPP041	963126	769	HMMER 2.1.1	PFAM: Malic enzyme	PF00390	243.6	258	572

			blastx.14	mitochondrial NAD(P) ⁺ - dependent malic enzyme [Homo sapiens]	gi 187300 gb AAA36197.1	99%	186	569
HMSHI83	1204709	217	blastx.2	malate dehydrogenase (NAD ⁺) (EC 1.1.1.-) precursor, mitochondrial - human	pir A39503 A39503	98%	2	1720
HMSHI83	963083	770	HMMER 2.1.1	PFAM: Malic enzyme	PF00390	621.6	41	751
			blastx.14	mitochondrial NAD(P) ⁺ - dependent malic enzyme [Homo sapiens]	gi 187300 gb AAA36197.1	96% 72% 43%	2 753 855	784 785 902
HTEPM45	952389	218	HMMER 2.1.1	PFAM: Malic enzyme	PF00390	924.1	33	1175
			blastx.2	malate dehydrogenase (NAD ⁺) (EC 1.1.1.-) precursor, mitochondrial - human	pir A39503 A39503	97%	33	1229
HTEPM45	953366	771	HMMER 2.1.1	PFAM: Fibrillar collagen C-terminal domain	PF01410	561.6	286	939
			blastx.2	prepro-alpha-1 type 3 collagen [Homo sapiens]	emb CAA32583.1	100% 59% 54% 54% 54% 53% 54% 48% 50%	37 31 37 37 31 37 37 43 43	942 126 132 129 129 126 129 129 126
HE8OV13	1228507	219	blastx.2	myosin heavy chain	pir S51823 S51823	44%	33	923

HE8OV13	911341	772		ATM2 - Arabidopsis thaliana (fragment)		32%	1263	1484
			HMMER 1.8	PFAM: Myosin head (motor domain) (contains ATP/GTP binding P-loop)	PF00063	91.04	29	268
			blastx.14	myr 6 myosin heavy chain [Rattus norvegicus]	gi 1575333 gb AAB38840.1	46% 40% 40% 32%	41 617 608 449	274 742 697 559
HELGU27	1011928	220	blastx.2	MYOSIN I.	sp Q63357 Q63357	93% 100%	1 788	786 817
HELGU27	923702	773	HMMER 2.1.1	PFAM: Myosin head (motor domain)	PF00063	256.3	8	640
			blastx.14	myosin I [Rattus norvegicus]	gi 3724141 emb CAA50871.1	97% 100% 100% 100%	11 688 662 719	640 717 676 736
HHEDC90	1226157	221	blastx.2	MYOSIN I.	sp Q63357 Q63357	57%	216	3263
HHEDC90	911447	774	HMMER 2.1.1	PFAM: Myosin head (motor domain)	PF00063	241.2	25	597
			blastx.14	myosin I [Rattus norvegicus]	gi 3724141 emb CAA50871.1	67%	1	645
HNBRB59	685902	222	HMMER 1.8	PFAM: Myosin head (motor domain) (contains ATP/GTP binding P-loop)	PF00063	94.31	85	243
			blastx.2	MYOSIN II NONMUSCLE (FRAGMENT).	sp Q91300 Q91300	92%	85	246
HNNBI16	965414	223	HMMER 2.1.1	PFAM: Myosin head (motor domain)	PF00063	116.7	101	292

HUJCL61	1223496	224	blastx.2	myosin I gamma, MMI gamma - mouse (fragment)	pir C45438 C45438	49%	101	337
HUJCL61	911432	776	HMMER 2.1.1	MYOSIN I.	sp Q63357 Q63357	59% 47% 41%	159 2698 364	2717 3207 414
HWLRC68	1089187	225	blastx.2	PFAM: Myosin head (motor domain)	PF00063	196	170	544
HWLRC68	911481	777	HMMER 2.1.1	myosin I [Rattus norvegicus]	gi 3724141 emb CAA 50871.1	72% 55% 81%	140 604 534	532 750 599
HFXFH42	713795	778	HMMER 1.8	Myosin X (Fragment).	sp AAF36524 AAF36 524	100% 92% 66%	90 1238 1267	1238 1276 1302
HEQAN73	958912	227	HMMER 2.1.1	PFAM: Myosin head (motor domain)	PF00063	97.7	222	485
HSLFS31	1106294	228	blastx.2	PFAM: Neuraminidases	PF00064	9.26	259	354
HSLFS31	921511	779	HMMER 2.1.1	PFAM: Phosphoglycerate mutase family	PF00300	64.2	87	359
HELGK56	1103702	229	blastx.2	Hypothetical 30.1 kDa protein.	sp CAC01127 CAC0 1127	99%	69	878
			blastx.2	right oriC-binding protein - Escherichia coli	pir JU0158 JU0158	99%	566	252
			HMMER 2.1.1	PFAM: Phosphoglycerate mutase family	PF00300	71.6	12	149
			blastx.14	Kenn Rudd identifies as gpmB [Escherichia coli]	gi 537235 gb AAA97 291.1	96% 100%	3 188	188 223
			blastx.2	pyruvate kinase (EC 2.7.1.40) A - Escherichia	pir S29790 S29790	96% 63%	572 619	96 554

HEL GK56	925698	780	HMMER 2.1.1 blastx.14	coli PFAM: Pyruvate kinase	PF00224	406.9	147	731
HAMFW05	957586	230	HMMER 1.8 blastx.2	pyruvate kinase type II [Escherichia coli] PFAM: Prolyl oligopeptidase family R26984_1 (FRAGMENT).	gi 147459 gb AAA24 473.1 PF00326 sp O75273 O75273	98% 65% 33.83 95%	147 21 1 1	731 107 174 558
HTEDG81	1193054	231	blastx.2	ALPHA 4 SUBUNIT OF 20S PROTEASOME.	sp Q9PTW9 Q9PTW 9	89%	79	771
HTEDG81	772995	781	HMMER 2.1.1	PFAM: Proteasome A- type and B-type	PF00227	114.6	180	488
HAMGO24	943287	232	HMMER 2.1.1 blastx.2	PFAM: Ribonucleotide reductases hypothetical protein DKFZp761E1312.1 - human (fragment)	PF00268 pir T46249 T46249	316.2 90%	2 2	490 550
HMWBH91	1193044	233	blastx.2	house-keeping protein - mouse	pir S27870 S27870	53% 52%	282 121	1295 279
HMWBH91	882083	782	HMMER 1.8	PFAM: Ribosomal RNA adenine dimethylases	PF00398	23.82	385	921
HOECH19	965639	234	HMMER 1.8 blastx.2	PFAM: Ribosomal RNA adenine dimethylases CGI-75 PROTEIN.	PF00398 sp Q9Y384 Q9Y384	116.68 95% 100% 100%	173 140 72 911	934 853 161 934
HSRAA80	1121919	235	blastx.2	POLYMERASE (FRAGMENT).	sp Q9UQG0 Q9UQG 0	63% 39%	17 421	361 498
HSRAA80	937640	783	HMMER	PFAM: Reverse	PF00078	20.88	11	130

				1.8	transcriptase (RNA- dependent DNA polymerase)					
				blastx.14	(AF080232) polymerase [Human endogenous retrovirus K.]	gi 3600069 gb AAC6 3292.1	65%	17	325	
HHEDF50	1174682	236		blastx.2	nitrogen regulation protein II (EC 2.7.3.-) ntrB - Escherichia coli	pir A30377 RGECGL	89%	44	490	
HHEDF50	974396	784		HMMER 1.8	PFAM: Signal C terminal domain	PF00512	115.35	65	490	
				blastx.14	NR(II) (ghnL gene product) (AA 1-349) [Escherichia coli]	gi 41564 emb CAA28 807.1	100%	86	427	
HHMK34	974395	237		HMMER 1.8	PFAM: Signal C terminal domain	PF00512	62.83	56	277	
				blastx.2	nitrogen regulation protein II (EC 2.7.3.-) ntrB - Escherichia coli	pir A30377 RGECGL	78%	50	415	
HMAGK69	1105451	238		blastx.2	hypothetical 60.6 kD protein in dcub-lysu intergenic region - Escherichia coli (strain K- 12)	pir D65222 D65222	96% 100%	523 618	26 523	
HMAGK69	723186	785		HMMER 1.8	PFAM: Signal C terminal domain	PF00512	40.87	31	405	
HNGNW52	1132300	239		blastx.2	protein-histidine kinase (EC 2.7.3.-) - Escherichia coli	pir G64840 G64840	93% 80% 90%	939 86 37	55 42 5	
HNGNW52	883074	786		HMMER	PFAM: Signal C terminal	PF00512	174.7	464	997	

				1.8	domain				
H6EDK67	974775	240		HMMER 2.1.1	PFAM: Signal peptidase I	PF00461	218.3	165	641
HWBCS43	1151532	241		blastx.2	signal peptidase (EC 3.4.99.-) 21K chain - dog	pir A34229 A34229	98%	93	668
HWBCS43	772564	787		blastx.2	signal peptidase (EC 3.4.99.-) 18K chain - dog	pir A35309 A35309	93%	344	880
HCE3H71	961681	242		HMMER 2.1.1	PFAM: Signal peptidase I	PF00461	117.2	381	653
				HMMER 2.1.1	PFAM: Sushi domain (SCR repeat)	PF00084	79.2	317	496
				blastx.2	seizure-related protein SEZ-6 precursor - mouse	pir I52657 I52657	83%	5	685
							64%	565	957
							30%	98	496
							48%	929	1000
HOFMS43	947973	243		HMMER 2.1.1	PFAM: Sushi domain (SCR repeat)	PF00084	64	174	302
				blastx.2	PORCINE MEMBRANE COFACTOR PROTEIN.	sp O02839 O02839	47%	12	317
HOVCO14	947999	244		HMMER 2.1.1	PFAM: Sushi domain (SCR repeat)	PF00084	84	21	170
				blastx.2	UNKNOWN PROTEIN (FRAGMENT).	sp Q28797 Q28797	33%	21	347
							34%	21	380
							38%	424	516
							47%	424	474
HTOBE75	1161571	245		blastx.2	P-SELECTIN PRECURSOR (GRANULE MEMBRANE PROTEIN 140) 1-MOLECULE 3)	sp P16109 LEM3_H UMAN	95%	3	1067
							38%	3	878
							37%	3	866
							35%	3	863
							34%	3	866

HTOBE75	591896	788			(LECAM3). PFAM: Sushi domain (SCR repeat)	PF00084		39%	48	866
HCMSL08	898203	246		HMMER 2.1.1	PFAM: Calsequestrin	PF01216		61.2	100	273
				HMMER 2.1.1				1001.1	52	1221
				blastx.2	calsequestrin precursor, fast skeletal muscle - human	pir A60424 A60424		95%	112	1197
HCMSL08	959176	789		HMMER 2.1.1	PFAM: Calsequestrin	PF01216		697.4	1372	569
				blastx.14	calmitine; calsequestrine [Homo sapiens]	gi 688292 gb AAB32 063.1		93%	1372	593
HDPBS64	846624	247		HMMER 1.8	PFAM: Thioredoxins	PF00085		116.87	173	493
				blastx.2	ZK973.11 protein.	sp AAF40013 AAF40 013		32%	182	652
HDTBR50	846630	248		HMMER 1.8	PFAM: Thioredoxins	PF00085		29.85	163	297
				blastx.2	NM23-H8.	sp AAF20909 AAF20 909		100%	130	327
HTDAB17	890384	249		HMMER 2.1.1	PFAM: Thioredoxin	PF00085		97%	327	467
				blastx.2	CG1837 PROTEIN.			107.9	276	533
						sp Q9VYV3 Q9VYV 3		42%	225	518
HABAE22	1227053	250		blastx.2	CARBOXY TERMINUS OF HSP70- INTERACTING PROTEIN.	sp Q9UNE7 Q9UNE7		43%	231	539
								41%	348	533
								95%	169	1023
HABAE22	965314	790		HMMER	PFAM: TPR Domain	PF00515		38.4	300	383

			2.1.1 blastx.14	(AF039689) antigen NY- CO-7 [Homo sapiens]	gi 3170178 gb AAC1 8038.1	92%	171	725
HE9MI70	1217048	251	blastx.2	UBIQUITIN CARBOXYL- TERMINAL HYDROLASE 25 (EC 3.1.2.15) 1 PROTEASE 25) (DEUBIQUITINATING ENZYME 25).	sp P57080 UBPP_M OUSE	52%	15	758
HE9MI70	953319	791	HMMER 1.8	PFAM: TPR Domain	PF00515	16.42	154	240
HHFDK15	854734	792	HMMER 2.1.1	PFAM: TPR Domain	PF00515	21.7	213	299
HOSNZ11	1162664	253	blastx.2	conserved hypothetical protein MTH68 - Methanobacterium 1	pir E69190 E69190	36%	134	448
HOSNZ11	965875	793	HMMER 2.1.1	PFAM: TPR Domain	PF00515	30.3	144	230
			blastx.14	(AE000798) O-linked GlcNAc transferase [Methanobacterium thermoautotrophicum]	gi 2621106 gb AAB8 4576.1	34% 23% 36%	249 3 395	362 236 484
HTAEW05	1151514	254	blastx.2	DJ979N1.1 (DJ979N1.1).	sp Q9UGR2 Q9UGR 2	100%	215	658
HTAEW05	838562	794	HMMER 1.8	PFAM: TPR Domain	PF00515	16.51	460	546
HTTKN45	1181807	255	blastx.2	BCDNA:GH04929 PROTEIN.	sp Q9V3G6 Q9V3G6	23%	420	1583

HTTKN45	914589	795	HMMER 1.8	PFAM: TPR Domain	PF00515	18.74	383	469
			blastx.14	(AF181631) BcDNA.GH04929 [Drosophila melanogaster]	gi 5901818 gb AAD5 5417.1 AF181631_1	46% 26%	539 386	685 487
HUSJN62	923146	256	HMMER 2.1.1	PFAM: TPR Domain	PF00515	38.4	1075	992
			blastx.2	CARBOXY TERMINUS OF HSP70- INTERACTING PROTEIN.	sp Q9UNE7 Q9UNE7	94%	1189	353
HTEIU92	1102681	257	blastx.2	Transketolase (EC 2.2.1.1).	sp AAF76194 AAF76 194	71%	1	564
HTEIU92	870652	796	HMMER 2.1.1	PFAM: Transketolase	PF00456	70.1	1	225
HAQMD86	1105267	258	blastx.2	UBIQUITIN CARBOXYL- TERMINAL HYDROLASE 10 (EC 3.1.2.15) 1 1	sp Q14694 UBPA_H UMAN	96%	13	1878
HAQMD86	961459	797	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2	PF00443	89.1	1700	1900
			blastx.14	similar to ubiquitin- specific proteinase of S.cerevisiae. [Homo sapiens]	gi 1136438 dbj BAA1 1507.1	96%	2	1879
HBJJG02	1151462	259	blastx.2	CG5794 PROTEIN.	sp Q9VC56 Q9VC56	48%	795	1409
HBJJG02	919508	798	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal	PF00443	80.6	176	460

[illegible]

HBMUJ35	956041	800	HMMER 2.1.1	3.1.2.15) 1 1	PF00443	54.6	492	355
			blastx.14	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2 (AF177758) ubiquitin specific protease 16 [Homo sapiens]	gi 5853113 gb AAD5 4321.1 AF177758_1	98% 91%	627 359	355 288
HCEBP60	1227635	262	blastx.2	LSFR3 PROTEIN (FRAGMENT).	sp Q9W6U5 Q9W6U 5	85% 75%	1737 2863	2846 2910
HCEBP60	812297	801	HMMER 1.8	PFAM: Ubiquitin carboxyl-terminal hydrolases family 2	PF00443	59.49	168	281
HFGMA55	1150870	263	blastx.2	UBIQUITIN CARBOXYL- TERMINAL HYDROLASE 23 (EC 3.1.2.15) 1 1	sp Q9UK80 UBPN_H UMAN	100%	10	444
HFGMA55	858681	802	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2	PF00443	57.8	237	377
HLHTE91	789603	264	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2	PF00443	92.4	862	1068
			blastx.2	DEUBIQUITINATING ENZYME.	sp Q9UNP0 Q9UNP0	40%	409	1077
HLHTE91	868803	803	HMMER 2.1.1	PFAM: MYND finger	PF01753	33.7	393	521
HLFYI58	1151495	265	blastx.2	UBIQUITIN CARBOXYL- TERMINAL	sp Q9Y5T5 UBPG_H UMAN	100%	2	625

HLFYFI58	924193	805	HMMER 2.1.1	HYDROLASE 16 (EC 3.1.2.15) 1 1 1	PF00443	77.4	368	619
			blastx.14	(AF126736) ubiquitin processing protease [Homo sapiens]	gi 4454565 gb AAD2 0949.1	100%	2	625
HNINBJ44	915273	806	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2	PF00443	50.1	1045	1131
			blastx.14	similar to ubiquitin carboxyl-terminal hydrolase; 1 1 cDNA EST EMBL:D34547 comes from this gene; cDNA EST EMBL:D37684	gi 3879501 emb CAA 87795.1	44% 28% 42% 35% 23% 72%	688 292 1276 1093 1961 1057	915 462 1332 1134 2062 1089
HSLJI46	997643	267	blastx.2	UBIQUITIN CARBOXYL- TERMINAL HYDROLASE 8 (EC 3.1.2.15) 1 1	sp P40818 UBP8_HU MAN	82% 100% 79%	64 1 510	498 87 596
HSLJI46	883028	807	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2	PF00443	99.8	1336	1521
HTFOK70	1151518	268	blastx.2	CG3016 PROTEIN.	sp Q9W462 Q9W462	56% 41%	361 16	561 153
HTFOK70	914561	808	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2	PF00443	63.6	359	568

HUSXO71	1164014	269	blastx.14	(AC003974) putative ubiquitin specific protease [Arabidopsis thaliana]	gi 2914695 gb AAC0 4485.1	60% 39% 37%	473 7 368	571 129 472
HUSXO71	862649	809	blastx.2	UBIQUITIN CARBOXYL- TERMINAL HYDROLASE 18 (EC 3.1.2.15) 1 1 1	sp Q9UMW8 UBPI_ HUMAN	100%	400	480
HWBDP39	1223498	270	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2	PF00443	65.2	1290	1505
HWBDP39	810403	810	blastx.2	CDNA FLJ20314 FIS, CLONE HEP07831.	sp BAA91084 BAA9 1084	88%	1313	2239
HKMMQ73	840459	271	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2	PF00443	55.2	227	382
HVVBK72	1179755	272	HMMER 1.8	PFAM: UDP- glucuronosyl and UDP- glucosyl transferases	PF00201	93.48	28	327
HVVBK72	933167	812	blastx.2	2-hydroxyacylsphingosine 1-beta- galactosyltransferase (EC 1	pir JC5423 JC5423	88%	7	417
H7TXB52	981972	273	blastx.2	glucuronosyltransferase (EC 2.4.1.17) UGT2B13 precursor - rabbit	pir B47113 B47113	35%	69	461
			HMMER 1.8	PFAM: UDP- glucuronosyl and UDP- glucosyl transferases	PF00201	70.01	2	391
			blastx.2	DUAL SPECIFICITY	sp Q9UNI6 DUSC_H	100%	303	1322

H7TXB52	910910	813	HMMER 2.1.1	PROTEIN PHOSPHATASE 12 (EC 3.1.3.48) (EC 1 PFAM: Dual specificity phosphatase, catalytic domain	UMAN PF00782	117.9	378	806
			blastx.14	(AB004537) PROTEIN- TYROSINE PHOSPHATASE YVH1 [Schizosaccharomyces pombe]	gi 2257526 dbj BAA2 1420.1	26% 48% 52% 38%	516 1143 1092 960	968 1292 1142 1013
HDPY71	1217205	274	blastx.2	Mitogen-activated protein kinase phosphatase x.	sp AAF86649 AAF86 649	99% 100%	531 392	848 529
HDPY71	971345	814	HMMER 2.1.1	PFAM: Dual specificity phosphatase, catalytic domain	PF00782	109.1	492	719
			blastx.14	DsPTP1 protein [Arabidopsis thaliana]	gi 4150963 emb CAA 77232.1	48% 43%	492 377	716 487
HGOCA12	968763	275	HMMER 2.1.1	PFAM: Dual specificity phosphatase, catalytic domain	PF00782	28.6	112	360
			blastx.2	PROTEIN PHOSPHATASE.	sp Q9UII6 Q9UII6	40%	25	360
HGOCA12	971583	815	HMMER 2.1.1	PFAM: Dual specificity phosphatase, catalytic domain	PF00782	60.1	467	318
			blastx.14	phosphatase tyrosine/serine [Homo sapiens]	gi 181840 gb AAA35 777.1	48%	515	318
HHCJ29	1077517	276	blastx.2	hypothetical protein	pir T14756 T14756	100%	490	1716

[illegible]

					INDUCED DIFFERENTIATION ASSOCIATED PROTEIN 1.						
HMLAO23	675329	819	HMMER 2.1.1		PFAM: Glutathione S- transferases.	PF00043	29.5	23	184		
HELDW45	944301	282	HMMER 2.1.1		PFAM: Phosphoglucosyltransferase/phos phomannomutase	PF00408	133.1	114	512		
HSRBB31	1121889	283	blastx.2		phosphoglucosyltransferase (EC 5.4.2.2) - Escherichia coli	pir G64803 G64803	99%	3	512		
HSRBB31	958210	820	HMMER 1.8		3-methylcrotonyl-CoA carboxylase biotin- containing 1	sp BAA99407 BAA9 9407	100% 64% 54% 71%	3 493 395 707	440 861 526 790		
HTEOW39	1151517	284	blastx.2		PFAM: Biotin-requiring enzymes	PF00364	75.97	1455	1643		
HTEOW39	870566	821	HMMER 1.8		lysozyme (EC 3.2.1.17) - bare-faced crassow	pir JE0185 JE0185	49%	65	484		
HE2PE32	1106571	285	blastx.2		PFAM: C-type lysozymes and alpha-lactalbumin	PF00062	126.92	59	295		
HE2PE32	524511	822	HMMER 1.8		6-phospho-beta- glucosidase (EC 3.2.1.86) bgIB - Escherichia coli	pir B65175 B65175	85%	1	540		
HSIDW39	1211446	286	blastx.2		PFAM: Glycosyl hydrolases family 1	PF00232	87.26	17	289		
HSIDW39	775139	823	HMMER 2.1.1		Cytosolic beta- glucosidase (Fragment).	sp CAC08178 CAC0 8178	99%	56	748		
HSIDW39	775139	823	HMMER 2.1.1		PFAM: Glycosyl hydrolase family 1	PF00232	134	28	372		

				blastx.2	cytosolic beta-glucosidase [Cavia porcellus]	gb AAB41058.1	84%	1	363
HSIDW39	830774	824		HMMER 2.1.1	PFAM: Glycosyl hydrolase family 1	PF00232	155.5	42	419
HPMLD30	1226192	287		blastx.2	alpha-glucosidase (EC 3.2.1.20) - Escherichia coli	pir C64769 C64769	96%	44	1543
HPMLD30	937414	825		HMMER 1.8	PFAM: Alpha amylases (family of glycosyl hydrolases)	PF00128	18.21	402	479
				blastx.2	maltodextrin glucosidase [Escherichia coli]	gb AAB40159.1	99%	30	485
HOEKP17	1204712	288		blastx.2	FLAVOHEMOPROTEIN B5+B5R.	sp Q9UHI9 Q9UHI9	90% 97%	749 214	1675 870
HOEKP17	931049	826		HMMER 2.1.1	PFAM: Heme-binding domain in cytochrome b5 and oxidoreductases	PF00173	69.6	258	428
				blastx.14	(AL032654) similar to Heme-binding domain in 1	gi 3881161 emb CAA 21721.1	60% 35% 36% 60% 50% 39% 57% 55% 45%	261 1118 906 156 1253 1565 1352 1055 580	473 1285 1013 215 1318 1648 1393 1081 639
HFXDP67	1228141	289		blastx.2	hypothetical protein b0872 - Escherichia coli	pir H64825 H64825	95%	240	1205
HFXDP67	526951	827		HMMER 1.8	PFAM: FAD/NAD- binding domain in	PF00175	13.6	293	415

HJABA59	1199933	290		blastx.2	oxidoreductases	METHIONINE SYNTHASE REDUCTASE.	sp Q9UBK8 Q9UBK8	91%	2	904
HJABA59	713642	828		HMMER 1.8	PFAM: FAD/NAD- binding domain in oxidoreductases		PF00175	100.6	423	797
HKIXB03	1129055	291		blastx.2	CYTOCHROME B5 REDUCTASE B5R.2.		sp Q9UHHJ0 Q9UHHJ0	93% 82% 88%	197 2 70	370 88 96
HKIXB03	924636	829		HMMER 1.8	PFAM: FAD/NAD- binding domain in oxidoreductases		PF00175	31.48	192	326
				blastx.2	(AL133582) hypothetical protein [Homo sapiens]		emb CAB63726.1	85%	144	371
HKMMF49	1124742	292		blastx.2	Kidney superoxide- producing NADPH oxidase.		sp BAA95695 BAA95695	100%	10	600
HKMMF49	677960	830		HMMER 2.1.1	PFAM: Ferric reductase like transmembrane component		PF01794	63.6	79	294
HLDOG51	1151491	293		blastx.2	Neurospora crassa hypothetical protein 15E6.170 - Neurospora crassa		pir T48809 T48809	40% 32%	163 654	522 800
HLDOG51	918840	831		HMMER 2.1.1	PFAM: Oxidoreductase FAD/NAD-binding domain		PF00175	62.6	524	904
				blastx.14	phenolhydroxylase component [Acinetobacter]		gi 535285 emb CAA85385.1	32% 36%	269 860	370 967

HSVAI25	1130819	294	blastx.2	calcoacetatus]			37%	647	727
				Hypothetical 12.9 kDa protein.	sp BAB12124 BAB12124		42%	527	583
HSVAI25	577154	832	HMMER 1.8	PFAM: FAD/NAD-binding domain in oxidoreductases	PF00175		44%	215	268
							58%	524	652
HSXCP56	924635	295	HMMER 2.1.1	PFAM: FAD/NAD-binding Cytochrome reductase	PF00970		66%	663	761
							7.34	126	212
							162.3	243	500
			blastx.2	CYTOCHROME B5 REDUCTASE B5R.2.	sp Q9UHHJ0 Q9UHHJ0		91%	171	950
HBCAT08	1167275	296	blastx.2	PXN PROTEIN.	sp Q9VZZ4 Q9VZZ4		100%	142	240
							49%	71	2419
							37%	2237	2461
							50%	3295	3351
							36%	157	246
HBCAT08	920940	833	HMMER 1.8	PFAM: Peroxidases	PF00141		32.87	3	347
			blastx.14	similar to D.melanogaster peroxidase(U11052) [Homo sapiens]	gi 1504040 dbj BAA13219.1		92%	183	347
							93%	3	134
							92%	160	198
							29%	133	183
HHFBU53	1048855	297	blastx.2	subtilisin-like proprotein convertase (EC 3.4.21.-) PACE4 precursor, splice form A - human	pir A39490 A39490		85%	4	570
HHFBU53	837647	834	HMMER 2.1.1	PFAM: Proprotein convertase P-domain	PF01483		254.1	381	797
HTTDO45	942505	298	HMMER	PFAM: Thiolase	PF00108		794.8	459	1637

				2.1.1 blastx.2	3-oxoacyl-CoA thiolase - human	pir S434440 S43440	92%	456	1640
HTPII72	1104236	299		blastx.2	valine--tRNA ligase (EC 6.1.1.9) - rat (fragment)	pir PN0473 PN0473	51%	4	657
HTPII72	958035	835		HMMER 1.8 blastx.14	PFAM: tRNA synthetases class I transfer RNA-Val synthetase [Rattus norvegicus]	PF00133 gi 207625 gb AAA42 320.1	280.02 56% 51% 58%	4	645
H6BSE22	1151371	300		blastx.2	UBIQUITIN CARBOXYL- TERMINAL HYDROLASE 16 (EC 3.1.2.15) 1 1 1	sp Q9Y5T5 UBPG_H UMAN	99%	156	623
H6BSE22	969019	836		HMMER 2.1.1 blastx.14	PFAM: Ubiquitin carboxyl-terminal hydrolases family 2 (AF126736) ubiquitin processing protease [Homo sapiens]	PF00442 gi 4454565 gb AAD2 0949.1	41.8 94% 100% 94% 100% 42% 50%	738	833
HDPAE43	1220621	301		blastx.2	Ubiquitin specific protease (Fragment).	sp AAF66953 AAF66 953	80%	114	1586
HDPAE43	864998	837		HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolases family 2	PF00442	63.9	236	331
HDPFM16	1193042	302		blastx.2	CG8830 PROTEIN.	sp Q9V6C0 Q9V6C0	53%	180	470

HDPFM16	810401	838	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolases family 2	PF00442	50% 30% 41% 41%	983 1571 611 1319	1201 1828 778 1435
HFPCN10	1151478	303	blastx.2	CDNA FLJ10809 FIS, CLONE NT2RP4000927, WEAKLY SIMILAR TO 1 1	sp BAA91825 BAA9 1825	69%	330	518
HFPCN10	915568	839	HMMER 1.8 blastx.14	PFAM: Ubiquitin carboxyl-terminal hydrolases family 2 (AL031525) ubiquitin carboxyl-terminal hydrolase [Schizosaccharomyces pombe]	PF00442 gi 3560166 emb CAA 20678.1	32.31 50% 33%	417 345 466	470 464 555
HLQFO35	933901	840	HMMER 1.8	PFAM: Ubiquitin carboxyl-terminal hydrolases family 2	PF00442	11.44	131	181
HMWTU94	1150834	305	blastx.2	UBIQUITIN CARBOXYL- TERMINAL HYDROLASE 12 (EC 3.1.2.15) 1 1 1	sp O75317 UBPC_H UMAN	92%	162	536
HMWTU94	705880	841	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolases family 2	PF00442	58.8	231	326

HSATQ28	1124600	306	blastx.2	PRO0758.	sp AAF71030 AAF71030	86%	222	491
HSATQ28	866951	842	HMMER 1.8	PFAM: Ubiquitin carboxyl-terminal hydrolases family 2	PF00442	11.1	90	122
HTPIL46	1196787	307	blastx.2	Cyld protein.	sp CAB93533 CAB93533	99%	963	1859
						99%	246	962
						99%	1870	2265
						37%	669	842
						37%	1596	1754
HTPIL46	973570	843	HMMER 2.1.1	PFAM: CAP-Gly domain	PF01302	28.2	872	955
			blastx.2	(AF161542) HSPC057 [Homo sapiens]	gb AAF29029.1 AF161542_1	93%	626	2167
						100%	2143	2169
						45%	512	577
HNGEN37	1103305	308	blastx.2	indole-3-glycerol-phosphate synthase (EC 4.1.1.48) / 1 coli	pir A64874 GWEC	99%	1	531
HNGEN37	663955	844	HMMER 2.1.1	PFAM: Indole-3-glycerol phosphate synthases	PF00218	125.4	2	223
HLMDO77	974855	309	HMMER 1.8	PFAM: Trypsin	PF00089	114.97	116	523
			blastx.2	Complement C1r-like proteinase precursor.	sp AAF44349 AAF44349	100%	116	547
HNKAZ51	1154961	310	blastx.2	SERINE PROTEASE DESC1.	sp Q9UL52 Q9UL52	48%	100	957
HNKAZ51	947067	846	HMMER 1.8	PFAM: Trypsin	PF00089	124.58	259	594
			blastx.2	(AF064819) serine protease DESC1 [Homo	gb AAF04328.1 AF064819_1	42%	100	603
						35%	677	832

HOGDR01	919899	311	HMMER 1.8	sapiens] PFAM: Trypsin	PF00089	46%	603	686
HOGDR01	947085	847	blastx.2	SP001LA (FRAGMENT).	sp O43342 O43342	99%	165	890
			HMMER 1.8	PFAM: Trypsin	PF00089	320.16	161	871
			blastx.2	(AC003965) SP001LA [Homo sapiens]	gb AAB93671.1	99%	155	967
HUKEP18	957456	312	HMMER 1.8	PFAM: Trypsin	PF00089	82.96	729	361
			blastx.2	TESTES-SPECIFIC PROTEIN TSP50.	sp Q9UI38 Q9UI38	100%	735	340
HWHGF95	1155021	313	blastx.2	KALLIKREIN 9 PRECURSOR (EC 3.4.21.-) (KALLIKREIN- LIKE 1	sp Q9UKQ9 KLK9_ HUMAN	94%	36	743
HWHGF95	947019	848	HMMER 1.8	PFAM: Trypsin	PF00089	309.92	56	724
			blastx.2	(AF135026) kallikrein- like protein 3 KLK-L3 [Homo sapiens]	gb AAD26427.2 AF1 35026_1	93%	35	742
HEMFC61	836514	314	HMMER 2.1.1	PFAM: Aldehyde dehydrogenase family	PF00171	397.1	10	642
			blastx.2	RETINALDEHYDE- SPECIFIC DEHYDROGENASE TYPE 2 (EC 1.2.1.-) (RALDH(II)) (RALDH- 2).	sp O94788 DHAS_H UMAN	98%	4	642
HEOQP44	942596	315	HMMER	PFAM: Beta-lactamase	PF00144	420.7	250	1026

			2.1.1						
			blastx.2		beta-lactamase (EC 3.5.2.6) - phage phi-X174	pir S47061 S47061	95%	169	1026
HHEKZ12	878267	316	HMMER 1.8		PFAM: Beta-lactamases	PF00144	132.1	102	380
			blastx.2		beta-lactamase (EC 3.5.2.6) - phage phi-X174	pir S47061 S47061	98% 65%	21 377	377 436
HHELA35	878217	317	HMMER 2.1.1		PFAM: Beta-lactamase	PF00144	175.4	118	450
			blastx.2		beta-lactamase (EC 3.5.2.6) - phage phi-X174	pir S47061 S47061	98%	37	450
HSYBQ34	972295	849	HMMER 1.8		PFAM: Beta-lactamases	PF00144	387.58	2697	3473
HFCBA44	948533	319	HMMER 1.8		PFAM: Carboxylesterases	PF00135	34.24	315	485
			blastx.2		thiolesterase B (EC 3.-.-.) precursor - mallard	pir A47162 A47162	56% 60% 48%	2 423 184	208 482 264
HOUBE50	948519	320	HMMER 1.8		PFAM: Carboxylesterases	PF00135	55.97	16	243
			blastx.2		Neurologin 3 isoform HNLI3s (Fragment).	sp AAF71231 AAF71 231	70%	31	243
HDPAS16	734057	321	HMMER 2.1.1		PFAM: Carbamoyl- phosphate synthase (CPSase)	PF00289	137.8	220	495
			blastx.2		3-methylcrotonyl-CoA carboxylase biotin- containing 1	sp BAA99407 BAA9 9407	89%	112	495
HFLAA23	960332	322	HMMER 2.1.1		PFAM: FGXY family of carbohydrate kinases	PF00370	314	137	784

HCFMZ90	922112	323	blastx.2 1.8	L-xylulokinase (EC 2.7.1.53) - Escherichia coli	pir S47801 S47801	86%	8	784
HFCES27	1103330	324	HMMER 1.8	PFAM: Beta-ketoacyl synthases	PF00109	194.57	291	872
			blastx.2	CDNA FLJ20604 FIS, CLONE KAT06449.	sp BAA91286 BAA9 1286	92% 98% 59%	255 67 5	866 300 100
			blastx.2	CDNA FLJ20604 FIS, CLONE KAT06449.	sp BAA91286 BAA9 1286	94% 86%	506 198	1120 491
HFCES27	922115	850	HMMER 2.1.1	PFAM: Beta-ketoacyl synthase	PF00109	206.2	372	1001
HSDFK78	1155464	325	blastx.14	(AE000752) 3-oxoacyl- [acyl-carrier-protein] synthase II [Aquifex aeolicus]	gi 2984031 gb AAC0 7574.1	53% 78% 75% 37%	393 195 939 250	920 251 986 297
			blastx.2	biotin sulfoxide reductase (EC 1.-.-) 2 - Escherichia coli	pir H64949 H64949	89%	1	306
			HMMER 2.1.1	PFAM: Prokaryotic molybdopterin oxidoreductases	PF00384	34.8	297	374
HSDJX58	891067	326	HMMER 1.8	PFAM: NADH- Ubiquinone/plastoquinone , various chains	PF00361	97.09	1128	1487
HSDJX58	956591	852	blastx.2	hypothetical protein b2484 - Escherichia coli (strain K-12)	pir C65024 C65024	82%	735	1487
			HMMER 1.8	PFAM: NADH- Ubiquinone/plastoquinone	PF00361	100.08	387	19

[illegible]

HLWBU48	721520	856	HMMER 1.8	RETROVIRUS HERV- K(HML6) PROVIRAL CLONE HML6.17 1 1		77%	672	752
HWWEY71	1204720	331	blastx.2	PFAM: Retroviral aspartyl proteases	PF00077	64.25	14	280
				SERINE				
				HYDROXYMETHYLTR ANSFERASE, MITOCHONDRIAL PRECURSOR 1 1	sp P34897 GLYM_H UMAN	97%	595	1623
						97%	113	619
HWWEY71	970546	857	HMMER 2.1.1	PFAM: Serine hydroxymethyltransferase	PF00464	423.3	257	763
				SERINE				
				HYDROXYMETHYLTR ANSFERASE, MITOCHONDRIAL PRECURSOR 1 (SHMT).	sp P34897 GLYM_H UMAN	90%	113	859
HHFGD45	1151161	332	blastx.2	superoxide dismutase (EC 1.15.1.1) (Mn) sodA [validated] - Escherichia coli	pir A24141 DSECN	100%	880	290
HHFGD45	584855	858	HMMER 1.8	PFAM: Iron/manganese superoxide dismutases (SODM)	PF00081	111.46	133	267
HNHEB44	1161293	333	blastx.2	superoxide dismutase (EC 1.15.1.1) (Mn) sodA [validated] - Escherichia coli	pir A24141 DSECN	100%	23	613
HNHEB44	683284	859	HMMER 1.8	PFAM: Iron/manganese superoxide dismutases	PF00081	100.87	31	150

HMACX92	1151497	334	blastx.2	(SODM) L-serine dehydratase (EC 4.2.1.13) - rat	pir S01009 DWRTT	50%	176	1132
HMACX92	922250	860	HMMER 2.1.1	PFAM: Pyridoxal-phosphate dependent enzyme	PF00291	224.5	203	1105
			blastx.2	serine dehydratase (AA 1 - 327) [Rattus norvegicus]	emb CAA68721.1	61%	197	1153
HNTBW57	1193070	335	blastx.2	CDNA FLJ10916 FIS, CLONE OVARC1000309, WEAKLY SIMILAR TO 1	sp BAA91904 BAA91904	80% 100%	958 613	1302 777
HNTBW57	867327	861	HMMER 1.8	PFAM: Serine/threonine dehydratases, cysteine synthase and cystathionine	PF00291	41.43	425	673
HBSDC13	1105677	336	blastx.2	tartronate-semialdehyde synthase (EC 4.1.1.47) - Escherichia coli	pir JT0742 JT0742	68%	353	718
						83%	124	423
						51%	622	990
						85% 96%	840 47	959 130
HBSDC13	657402	862	HMMER 1.8	PFAM: Thiamine pyrophosphate enzymes	PF00205	26.75	3	182
HCWBX21	920486	337	HMMER 1.8	PFAM: Thiamine pyrophosphate enzymes	PF00205	22.15	82	261
			blastx.2	tartronate-semialdehyde synthase (EC 4.1.1.47) - Escherichia coli	pir JT0742 JT0742	88% 96% 43%	85 8 374	369 91 442
HFRBW72	916944	338	HMMER 2.1.1	PFAM: Thiamine pyrophosphate enzymes	PF00205	92.9	443	664

				blastx.2	pyruvate dehydrogenase (cytochrome) (EC 1.2.2.2) - Escherichia coli	pir A23648 DEECPC	81%	407	676
HSLJX23	1105530	339		blastx.2	tartronate-semialdehyde synthase (EC 4.1.1.47) - Escherichia coli	pir JT0742 JT0742	98%	2	496
HSLJX23	837470	863		HMMER 1.8	PFAM: Thiamine pyrophosphate enzymes	PF00205	57.57	2	193
HSLJX90	1105297	340		blastx.2	pyruvate dehydrogenase (cytochrome) (EC 1.2.2.2) - Escherichia coli	pir A23648 DEECPC	100%	1	438
HSLJX90	787575	864		HMMER 2.1.1	PFAM: Thiamine pyrophosphate enzymes	PF00205	95.2	2	274
HAUAI67	1102604	341		blastx.2	HSPC150.	sp AAF29114 AAF29 114	100%	137	727
HAUAI67	929241	865		HMMER 1.8	PFAM: Ubiquitin- conjugating enzymes	PF00179	128.71	236	508
				blastx.14	ubiquitin-conjugating enzyme [Schizosaccharomyces pombe]	gi 2330662 emb CAB 11183.1	54% 67% 32%	344 242 132	514 334 224
HDPTA89	953718	342		HMMER 1.8	PFAM: Ubiquitin- conjugating enzymes	PF00179	74.19	173	424
				blastx.2	UBC6P HOMOLOG.	sp Q9QX58 Q9QX58	95%	173	430
HMCBN45	927125	343		HMMER 1.8	PFAM: Ubiquitin- conjugating enzymes	PF00179	115.78	234	677
				blastx.2	hypothetical protein R09B3.4 - Caenorhabditis elegans	pir T24069 T24069	53%	216	680
HTTJY18	1223495	344		blastx.2	Non-Canonical Ubiquitin	sp CAB83212 CAB8	83%	376	1281

HTTJY18	950989	866	HMMER 1.8 blastx.2	Conjugating Enzyme 1 (NCUBE1). PFAM: Ubiquitin- conjugating enzymes (AF151834) CGI-76 protein [Homo sapiens]	3212	100%	330	365
HMAJL09	1157337	345	blastx.2	hypothetical 29.7K protein, ibpA-gyrB intergenic region - Escherichia coli (strain K- 12)	gb AAD34071.1 AF1 51834 1 pir B65172 QQECGB	98%	269	526
HMAJL09	950168	867	HMMER 1.8 blastx.14	PFAM: ADP-glucose pyrophosphorylase	PF00483	150.92	20	256
HSVCH37	558195	346	HMMER 2.1.1	PFAM: 3'5'-cyclic nucleotide phosphodiesterase	gi 290545 gb AAA62 048.1 PF00233	100% 100% 30	254 468 18	469 512 98
HTOCCG37	708888	347	HMMER 2.1.1 blastx.2	PFAM: 3'5'-cyclic nucleotide phosphodiesterase 3',5'-cyclic-nucleotide phosphodiesterase (EC 3.1.4.17) 8B, 1	PF00233 pir JE0293 JE0293	65.1 100% 53%	42 6 179	215 203 340
HBXAW47	771624	348	HMMER 2.1.1 blastx.2	PFAM: Protein phosphatase 2C PROTEIN PHOSPHATASE 2C	PF00481 sp Q9Z1Z6 Q9Z1Z6	80.5 85%	273 270	560 578
HBXAW27	909801	349	HMMER 2.1.1	PFAM: Phosphatidylinositol-	PF00388	113.6	1642	1797

				specific phospholipase C, X domain					
HSLJE54				blastx.2	Phospholipase C-beta-1a.	sp CAB98142 CAB98142	97%	1243	1803
	926924	350		HMMER 2.1.1	PFAM: Pyridoxal-dependent decarboxylase conserved domain	PF00282	35.8	342	536
				blastx.2	CYSTEINE SULFINIC ACID DECARBOXYLASE-RELATED PROTEIN 4.	sp Q9UNJ5 Q9UNJ5	98% 92% 85% 100%	198 542 721 885	548 739 885 908
HBXBG65	932780	351		HMMER 1.8	PFAM: Cytochrome P450	PF00067	46.55	2	535
				blastx.2	CHOLESTEROL 24-HYDROXYLASE.	sp Q9Y6A2 Q9Y6A2	98%	2	535
HE8CG83	933609	352		HMMER 2.1.1	PFAM: Protein phosphatase 2C	PF00481	42.6	757	942
				blastx.2	SCOP.	sp Q9WTR8 Q9WTR8	90% 70% 70% 60% 43% 30% 36%	321 712 1 977 41 118 369	707 1110 348 1021 151 279 443
HOGCW55	953161	353		HMMER 2.1.1	PFAM: Aminotransferases class-V	PF00266	56.5	132	341
				blastx.2	probable phosphoserine transaminase (EC 2.6.1.52), progesterone-	pir A26998 A26998	85% 77%	132 355	356 381

HNTND64	954871	354	HMMER 2.1.1	induced, endometrial - rabbit	PF00067	28.2	10	225
			blastx.2	PFAM: Cytochrome P450				
HHAWC08	957942	355	HMMER 1.8	cytochrome P450 - golden hamster	pir 48164 48164	37% 47%	10 261	264 329
			blastx.2	PFAM: IMP dehydrogenase / GMP reductase				
HFPEN04	964824	356	HMMER 1.8	Guanosine monophosphate reductase isolog.	sp BAA93080 BAA9 3080	100% 100%	334 975	975 1376
			blastx.2	PFAM: Aminotransferases class- III pyridoxal-phosphate				
HTZMB51	496523	357	HMMER 2.1.1	CG8745 PROTEIN.	sp Q9VU95 Q9VU95	62%	148	492
			blastx.2	PFAM: Lyase				
HNHDK43	529500	358	HMMER 1.8	adenylosuccinate lyase (EC 4.3.2.2) - Escherichia coli	pir S19212 S19212	97% 71%	73 2	399 127
			blastx.2	PFAM: tRNA synthetases class II				
HTTDP32	558751	359	HMMER 2.1.1	lysine--tRNA ligase (EC 6.1.1.6) - Escherichia coli	pir B65073 SYECKT	85% 90%	58 368	372 397
			blastx.2	PFAM: tRNA synthetases class I (L, M and V)				
			HMMER 2.1.1	PROBABLE LEUCYL- TRNA SYNTHETASE, MITOCHONDRIAL	sp Q15031 SYLM_H UMAN	98% 84% 45%	1 267 320	261 365 424
			blastx.2					

HSLEP27	572920	360	HMMER 2.1.1 blastx.2	PFAM: tRNA synthetases class I (I, L, M and V)	PF00133	133.5	5	409
HMTAL73	621705	361	HMMER 2.1.1 blastx.2	leucine--tRNA ligase (EC 6.1.1.4) [validated] - Escherichia coli	pir H64798 SYECL	96% 96%	14 405	409 599
				PFAM: Isocitrate and isopropylmalate dehydrogenases	PF00180	94.5	241	423
				isocitrate dehydrogenase (NAD+) (EC 1.1.1.41) beta chain isoform B - human	pir T13147 T13147	75% 100%	103 2	450 100
HMHBQ53	715301	362	HMMER 2.1.1 blastx.2	PFAM: Nucleotidyl transferase	PF00483	45.8	237	368
				GDP-MANNOSE PYROPHOSPHORYLAS E A.	sp Q9Y5P5 Q9Y5P5	100% 100%	231 376	377 423
HBICG44	715860	363	HMMER 2.1.1 blastx.2	PFAM: Thiolase	PF00108	33.1	189	272
				3-oxoacyl-CoA thiolase - human	pir S43440 S43440	100%	189	272
HSKXN70	753717	364	HMMER 2.1.1 blastx.2	PFAM: TPR Domain	PF00515	31.4	267	347
				CG5038 PROTEIN.	sp Q9VF81 Q9VF81	40%	114	344
HPIAC32	815942	365	HMMER 2.1.1 blastx.2	PFAM: Histidine acid phosphatase	PF00328	118.4	75	338
				acid phosphatase (EC 3.1.3.2) precursor - Escherichia coli	pir B36733 B36733	77% 92%	3 341	518 463

HHFFP57	835955	366	HMMER 2.1.1	PFAM: Signal peptidase I	PF00461	32.1	218	514
HFKJW01	836491	367	blastx.2	CG11110 PROTEIN.	sp Q9V959 Q9V959	57%	140	574
			HMMER 2.1.1	PFAM: Aldehyde dehydrogenase family	PF00171	174	96	440
			blastx.2	lactaldehyde dehydrogenase (EC 1.2.1.22) aldA - Escherichia coli	pir A38165 A38165	100%	96	440
HSDFL63	836498	368	HMMER 2.1.1	PFAM: Aldehyde dehydrogenase family	PF00171	127.4	1	234
			blastx.2	RETINALDEHYDE- SPECIFIC DEHYDROGENASE TYPE 2 (EC 1.2.1.-) (RALDH(II)) (RALDH- 2).	sp O94788 DHAS_H UMAN	100%	1	249
HLD0008	857070	369	HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2	PF00443	32.4	36	137
			blastx.2	CDNA FLJ10785 FIS, CLONE NT2RP4000457, WEAKLY SIMILAR TO 1	sp BAA91807 BAA9 1807	100% 80%	3 403	401 570
HMSHN43	867363	370	HMMER 2.1.1	PFAM: Nucleotidyl transferase	PF00483	53.7	70	231
			blastx.2	GDP-MANNNOSE PYROPHOSPHORYLAS E A.	sp Q9Y5P5 Q9Y5P5	90%	64	342
HBXCT92	871044	371	HMMER	PFAM: Nucleotidyl	PF00483	49.7	105	473

			2.1.1	transferase				
			blastx.2	Eukaryotic translation initiation factor EIF2B subunit 3.	sp AAF91351 AAF91351	97%	96	1451
H6EDP44	875744	372	HMME 2.1.1	PFAM: Nucleotidyl transferase	PF00483	129.6	190	768
			blastx.2	GDP-MANNOSE PYROPHOSPHORYLAS E B.	sp Q9Y5P6 Q9Y5P6	99% 100% 100% 32%	199 804 65 837	801 968 187 938
HLJBF94	875745	373	HMME 2.1.1	PFAM: Nucleotidyl transferase	PF00483	89.2	261	539
			blastx.2	GDP-MANNOSE PYROPHOSPHORYLAS E B.	sp Q9Y5P6 Q9Y5P6	81%	258	668
HTEHO28	877182	374	HMME 1.8	PFAM: Pyridine nucleotide-disulphide oxidoreductases class-I	PF00070	206.97	1166	441
			blastx.2	Thioredoxin reductase TR2 (Fragment).	sp AAD51325 AAD51325	97% 85% 97% 41%	1226 1857 2123 1383	432 1147 1869 1315
HE9PC30	880696	375	HMME 1.8	PFAM: Ubiquitin-conjugating enzymes	PF00179	69.1	85	285
			blastx.2	CGI-76 PROTEIN.	sp Q9Y385 Q9Y385	98% 96% 60%	43 555 527	381 638 586
HLMDN29	881288	376	HMME 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase family 2	PF00443	34.2	315	506

HWBCF78	911355	377	blastx.2	CG8830 PROTEIN.	sp Q9V6C0 Q9V6C0	43%	9	218
			HMMER 2.1.1	PFAM: Myosin head (motor domain)	PF00063	31%	399	503
HUKEN49	911465	378	blastx.2	myosin-I α - mouse	pir A59300 A59300	89%	148	288
			HMMER 1.8	PFAM: Myosin head (motor domain) (contains ATP/GTP binding P-loop)	PF00063	53.97	125	274
HCUDS02	914401	379	blastx.2	Myosin V.	sp AAF78910 AAF78910	66%	3	128
			HMMER 2.1.1	PFAM: Nucleotidyl transferase	PF00483	54%	125	274
HTTJU40	914402	380	blastx.2	CDNA FLJ10137 FIS, CLONE HEMBA1003136, WEAKLY SIMILAR TO 1	sp BAA91460 BAA91460	40%	333	431
			HMMER 2.1.1	PFAM: Nucleotidyl transferase	PF00483	91.6	84	650
HFXJX41	915649	381	blastx.2	GDP-MANNOSE PYROPHOSPHORYLAS E A.	sp Q9Y5P5 Q9Y5P5	98%	78	782
			HMMER 2.1.1	PFAM: Phosphoglucomutase/phosphomannomutase	PF00408	99%	907	1335
HFXJX41	915649	381	blastx.2	hypothetical protein b0644 - Escherichia coli	pir B64799 B64799	64%	755	1006
			HMMER 2.1.1	PFAM: Phosphoglucomutase/phosphomannomutase	PF00408	23.8	43	372
HFXJX41	915649	381	blastx.2	hypothetical protein b0644 - Escherichia coli	pir B64799 B64799	100%	40	417
			HMMER 2.1.1	PFAM: Phosphoglucomutase/phosphomannomutase	PF00408	100%	440	496
HFXJX41	915649	381	blastx.2	hypothetical protein b0644 - Escherichia coli	pir B64799 B64799	36.5	491	682
			HMMER 2.1.1	PFAM: Phosphoglucomutase/phosphomannomutase	PF00408	100%	3	308
HFXJX41	915649	381	blastx.2	hypothetical protein b0644 - Escherichia coli	pir B64799 B64799	100%	308	496
			HMMER 2.1.1	PFAM: Phosphoglucomutase/phosphomannomutase	PF00408	45%	6	308
HFXJX41	915649	381	blastx.2	hypothetical protein b0644 - Escherichia coli	pir B64799 B64799	43%	3	308
			HMMER 2.1.1	PFAM: Phosphoglucomutase/phosphomannomutase	PF00408			

HSLCK91	915650	382	HMMER 2.1.1	PFAM: Phosphoglucosyltransferase/phosphomannomutase	PF00408		36%	6	308
			blastx.2	phosphoglucosyltransferase (EC 5.4.2.2) - Escherichia coli	pir G64803 G64803		84%	1	375
			HMMER 2.1.1	PFAM: Serine hydroxymethyltransferase	PF00464		43	363	431
			blastx.2	SERINE HYDROXYMETHYLTRANSFERASE, MITOCHONDRIAL PRECURSOR 1	sp P34897 GLYM_HUMAN		92% 52% 48%	137 363 427	373 536 534
			HMMER 2.1.1	PFAM: Trypsin	PF00089		48.9	20	523
			blastx.2	SERINE PROTEASE (FRAGMENT).	sp O97658 O97658		62%	23	856
HSLAO29	917349	383	HMMER 2.1.1	PFAM: Aldehyde dehydrogenase family	PF00171		138.5	3	278
			blastx.2	lactaldehyde dehydrogenase (EC 1.2.1.22) aldA - Escherichia coli	pir A38165 A38165		98%	3	275
HRDBJ38	917583	384	HMMER 2.1.1						
			blastx.2						
HOUES64	918119	385	HMMER 2.1.1						
			blastx.2						

HWLHU02	918520	386	HMMER 2.1.1	PFAM: Hexokinase	PF00349	286.7	3	395
HEAHA84	919363	387	blastx.2	Hexokinase II.	sp CAA86476 CAA86476	79%	3	395
			HMMER 2.1.1	PFAM: Myosin head (motor domain)	PF00063	66%	3	395
HBMXQ90	922114	388	blastx.2	myosin I myr 4 - rat	pir A53933 A53933	36.3	87	245
			HMMER 2.1.1	PFAM: Beta-ketoacyl synthase	PF00109	96%	87	794
HOEJV72	930778	389	blastx.2	CDNA FLJ20604 FIS, CLONE KAT06449.	sp BAA91286 BAA91286	100%	794	1216
			HMMER 1.8	PFAM: Nucleoside diphosphate kinases	PF00334	20.5	218	301
HRDBH58	933364	390	blastx.2	NM23-H7.	sp Q9Y5B8 Q9Y5B8	103.55	362	757
			HMMER 1.8	PFAM: Aldehyde dehydrogenases	PF00171	95%	89	847
HCE3E13	951413	391	blastx.2	probable aldehyde dehydrogenase PA4073 [imported] - Pseudomonas aeruginosa (strain PAO1)	pir H83136 H83136	29%	569	1528
			HMMER 2.1.1	PFAM: tRNA synthetases class I (I, L, M and V)	PF00133	34%	244	450
HUKFO68	951652	392	blastx.2	valine-tRNA ligase precursor, mitochondrial - fission yeast (Schizosaccharomyces pombe)	pir T39630 T39630	95.6	148	603
			HMMER	PFAM: Hexokinase	PF00349	40%	151	603
						41%	4	213
						44%	569	649
						83%	645	662
						173.1	83	340

			2.1.1 blastx.2	Hexokinase I (Fragment).	sp AAF28854 AAF28 854	76%	83	355
						47%	83	373
						80%	3	80
						36%	3	77
HFXJW08	959204	393	HMMER 2.1.1 blastx.2	PFAM: tRNA synthetases class I (L, M and V) leucine--tRNA ligase (EC 6.1.1.4) [validated] - Escherichia coli	PF00133	86.6	224	487
HBTAD04	407351	394	blastx.2	malate synthase (EC 4.1.3.2) A - Escherichia coli	pir A32649 SYECM A	98%	240	1
HBTAD04	422687	868	HMMER 2.1.1	PFAM: Acetyltransferase (GNAT) family	PF00583	36.5	427	161
HE8FG51	465267	395	HMMER 2.1.1 blastx.2	PFAM: Eukaryotic initiation factor 5A hypsine (eIF-5A) EIF-5A2.	PF01287	165.7	4	258
					sp AAF98810 AAF98 810	98%	7	267
HTPDU31	503077	396	HMMER 2.1.1 blastx.2	PFAM: haloacid dehalogenase-like hydrolase DJ37E16.5 (NOVEL PROTEIN SIMILAR TO NITROPHENYLPHOSP HATASES 1	PF00702	26.3	147	296
					sp Q9UGY2 Q9UGY 2	94%	54	323
						100%	25	72
						100%	323	364
HMUBV12	549423	397	HMMER 2.1.1	PFAM: Hyaluronidase	PF01630	50.7	196	303
HMHBS90	574062	398	HMMER	PFAM: UBA domain	PF00627	35.6	436	543

			2.1.1 blastx.2		HRIHFB2157-LIKE PROTEIN (FRAGMENT).	sp Q9UHX4 Q9UHX 4	61% 100%	58 3	561 59
HLHGH34	575733	399	HMMER 1.8 blastx.2		PFAM: C-5 cytosine- specific DNA methylases PUTATIVE DNA CYTOSINE METHYLTRANSFERAS E DNMT2.	PF00145 sp O43669 O43669	33.72 100%	284 2	436 436
HELHC55	577384	400	HMMER 2.1.1 blastx.2		PFAM: Copper amine oxidase amine oxidase (copper- containing) (EC 1.4.3.6) tynA precursor - Escherichia coli	PF01179 pir E64889 E64889	88.8 96%	39 3	173 173
HKAAZ66	592105	401	HMMER 2.1.1 blastx.2		PFAM: Calpain family cysteine protease Calpain large polypeptide L2.	PF00648 sp AAF99682 AAF99 682	164.9 99% 98% 87%	222 90 416 648	422 422 640 671
HHSCN33	657367	402	HMMER 2.1.1 blastx.2		PFAM: HECT-domain (ubiquitin-transferase). NEDD4-like ubiquitin ligase 1.	PF00632 sp BAB13352 BAB1 3352	58.3 91%	166 1	348 390
HNGJQ15	660310	403	HMMER 2.1.1 blastx.2		PFAM: Histone deacetylase family CDNA FLJ10170 FIS, CLONE HEMBA1003690.	PF00850 sp BAA91474 BAA9 1474	33.2 75% 47%	70 70 196	192 192 264

HDJME16	661396	404	HMMER 2.1.1	WEAKLY SIMILAR TO 1	PFAM: FF domain	PF01846	53.7	34	183
HNTNR64	670033	405	HMMER 2.1.1	HUNTINGTON YEAST PARTNER C.	sp Q9WVC9 Q9WV C9	PF01344	84%	1	486
HMICO24	677036	406	HMMER 2.1.1	PFAM: Kelch motif	CDNA FLJ11078 FIS, CLONE PLACE1005102, WEAKLY SIMILAR TO 1	sp BAA91990 BAA9 1990	55.3	138	293
HMIAC23	679292	407	HMMER 2.1.1	PFAM: Chlorohydrolase	LYMPHOCYTE ACTIVATION- ASSOCIATED PROTEIN.	sp Q9Y2X2 Q9Y2X2	89.1	25	147
HSLFL74	685897	408	HMMER 2.1.1	PFAM: Guanine deaminase (EC 3.5.4.3) (GUANASE) (GUANINE 1)	GUANINE DEAMINASE (EC 3.5.4.3) (GUANASE) (GUANINE 1)	sp Q9R111 GUAD_ MOUSE	25.7	194	358
HSLFL74	685897	408	HMMER 2.1.1	PFAM: RNB-like proteins	PFAM: RNB-like proteins	PF00773	62%	62	457
HSLFL74	685897	408	HMMER 2.1.1	PFAM: RNB-like proteins	PFAM: RNB-like proteins	PF00773	87%	10	108
HSLFL74	685897	408	HMMER 2.1.1	PFAM: RNB-like proteins	PFAM: RNB-like proteins	PF00773	243.4	21	425

			blastx.2	exoribonuclease II (EC 3.1.13.1) - Escherichia coli	pir A64877 A64877	78%	705	1346
						97%	3	428
						75%	434	892
						94%	877	933
						48%	990	1064
HSDJD53	698259	409	HMMER 2.1.1	PFAM: Nitroreductase family	PF00881	86.9	193	513
			blastx.2	hypothetical protein, 20K (selD-sppA intergenic region) - Escherichia coli	pir A40360 A40360	80%	190	624
HCEBF33	702955	410	HMMER 2.1.1	PFAM: HECT-domain (ubiquitin-transferase).	PF00632	248.4	15	581
			blastx.2	Ubiquitin-protein ligase 1.	sp AAF36454 AAF36454	51%	21	581
HAPQW27	705518	411	HMMER 2.1.1	PFAM: Sterol O-acyltransferase	PF01800	180.1	1	279
			blastx.2	AGRP1 PROTEIN.	sp O75907 O75907	62%	1	432
HCFLZ28	707183	412	HMMER 2.1.1	PFAM: ThiF family	PF00899	93.7	166	444
			blastx.2	SUMO-1-ACTIVATING ENZYME E1 N SUBUNIT.	sp O95717 O95717	95%	142	447
						83%	495	545
HWCAB58	710377	413	HMMER 2.1.1	PFAM: Kelch motif	PF01344	53.3	21	164
			blastx.2	Kelch related protein 1.	sp CAC08185 CAC08185	49%	3	275
						59%	302	448
						29%	3	266
						28%	18	245
HLMMC57	713770	414	HMMER 2.1.1	PFAM: Acetyltransferase (GNAT) family	PF00583	31	272	406

HMEH37	717556	415	blastx.2	diamine N-acetyltransferase (EC 2.3.1.57) - spiny mouse (Mus saxicola)	pir S43430 S43430	39%	272	478
			HMMER 2.1.1	PFAM: Initiation factor 2 subunit family	PF01008	55%	55	135
HNGJ55	722240	416	blastx.2	probable translation initiation factor eIF-2B delta chain - human (fragment)	pir T08757 T08757	101.1	163	432
			HMMER 2.1.1	PFAM: MaoC like domain	PF01575	95%	163	441
HNGJ55	868063	869	blastx.2	membrane protein maoC - Escherichia coli	pir F64889 F64889	96%	1	164
HHGDG42	724795	417	HMMER 2.1.1	PFAM: MaoC like domain	PF01575	117.2	308	577
			blastx.2	PFAM: Acetyltransferase (GNAT) family	PF00583	100%	179	313
HMTMF31	731302	418	HMMER 2.1.1	diamine N-acetyltransferase (EC 2.3.1.57) - spiny mouse (Mus saxicola)	pir S43430 S43430	24.9	179	349
			blastx.2	PFAM: ThiF family	PF00899	40%	50	415
HSDIF59	739212	419	HMMER 2.1.1	CG1749 PROTEIN.	sp Q9VYY3 Q9VYY3	88	62	424
			blastx.2	PFAM: Flavin reductase like domain	PF01613	72%	411	683
				4-HYDROXYPHENYLAC	sp P75893 P75893	139.4	294	740

HNDAG60	751953	420	HMMER 2.1.1	ETATE 3- MONOOXYGENASE (EC 1.1.4.13.3).	PF01344	53.8	177	320
			blastx.2	PFAM: Kelch motif				
HSLDS79	753247	421	HMMER 2.1.1	NS1-BINDING PROTEIN.	sp Q9Y480 Q9Y480	67%	174	425
			blastx.2					
HSLDS79	879215	870	HMMER 2.1.1	alpha, alpha-trehalase (EC 3.2.1.28) precursor, periplasmic - Escherichia coli	pir S04782 S04782	100%	102	1622
			blastx.2					
HFBCQ61	769102	422	HMMER 2.1.1	PFAM: Trehalase	PF01204	102.4	132	392
			blastx.2	PFAM: Kelch motif				
HRACD17	769103	423	HMMER 2.1.1	hypothetical protein W02G9.2 - Caenorhabditis elegans	pir T33222 T33222	83.8	117	245
			blastx.2					
HRACD17	769103	423	HMMER 2.1.1	PFAM: Kelch motif	PF01344	108.4	245	343
			blastx.2					

HLDQV23	788957	424	blastx.2	CDNA FLJ10836 FIS, CLONE NT2RPP4001228, WEAKLY SIMILAR TO 1	sp BAA91845 BAA9 1845	94%	2	358
HPHAF45	812327	425	HMMER 2.1.1	PFAM: Glycosyl transferases	PF00535	59.7	71	364
			blastx.2	hypothetical protein F13G3.6 - Caenorhabditis elegans	pir T20856 T20856	42%	68	376
HSUME31	812373	426	HMMER 2.1.1	PFAM: Kelch motif	PF01344	88.4	22	162
			blastx.2	CDNA FLJ10262 FIS, CLONE HEMBB1000985, WEAKLY SIMILAR TO 1	sp BAA91514 BAA9 1514	100%	118	384
HUSHB56	815819	427	HMMER 2.1.1	PFAM: Exonuclease	PF00929	118.4	4	441
			blastx.2	ISG20 PROTEIN.	sp O00441 O00441	57%	1	441
			HMMER 2.1.1	PFAM: Calpain family cysteine protease	PF00648	70.1	101	346
HTGDN81	824708	428	blastx.2	CALPAIN-LIKE PROTEASE.	sp Q9WVF0 Q9WVF 0	87%	65	352
			HMMER 2.1.1	PFAM: RNB-like proteins	PF00773	395.6	417	1028
			blastx.2	virulence-associated protein vacB homolog - Escherichia coli	pir S56404 S56404	97%	417	998
						94%	1	435

HSKHY26	836598	429	HMMER 2.1.1 blastx.2	PFAM: Glycosyl transferases UDP- GALNAC:POLYPEPTID EN- ACETYL GALACTOSA MINYLTRANSFERASE.	PF00535	66.5	35	427
HKACD80	837698	430	HMMER 2.1.1 blastx.2	PFAM: Glycosyl hydrolase family 47 CDNA FLJ10783 FIS, CLONE NT2RP4000417, WEAKLY SIMILAR TO 1	sp Q9UUV5 Q9UUV5 PF01532	87%	41	559
HHFDK48	837782	431	HMMER 2.1.1 blastx.2	PFAM: Sulfatase N-acetylgalactosamine-4- sulfatase (EC 3.1.6.12) precursor - cat	sp BAA91806 BAA9 1806 PF00884	90% 49% 71% 65% 63%	165 511 508 624 605	521 687 570 683 637
HE9SS77	838043	432	HMMER 2.1.1 blastx.2	PFAM: Sulfatase CG6725 PROTEIN.	PF00884	112.1	213	671
HAPOK49	848205	433	HMMER 2.1.1 blastx.2	PFAM: UBA domain BS4 PROTEIN (NY- REN-18 ANTIGEN).	sp Q9VEX0 Q9VEX0 PF00627	61% 78.1	3 687	671 806
HPMGN48	848318	434	HMMER 2.1.1 blastx.2	PFAM: Initiation factor 2 subunit family CG11334 PROTEIN.	sp Q9Y5A7 BS4_HU MAN PF01008	77% 71% 89% 264.5	195 833 47 75	872 1063 187 572
					sp Q9V9X4 Q9V9X4	60%	78	605

HUVHP54	849278	435	HMMER 2.1.1 blastx.2	PFAM: Dienelactone hydrolase family Hypothetical 34.2 kDa protein.	PF01738	80.3	354	1001
HSLDK59	853385	436	HMMER 2.1.1 blastx.2	PFAM: N- acetylmuramoyl-L-alanine amidase hypothetical protein b0867 precursor - Escherichia coli	sp AAG12612 AAG1 2612 PF01510	31% 80.6	330 500	1001 736
HMWDI41	854051	437	HMMER 2.1.1 blastx.2	PFAM: Kelch motif	pir C64825 C64825	100% 78%	500 183	1009 557
HFVHU73	856165	438	HMMER 2.1.1 blastx.2	PFAM: RNB-like proteins ribonuclease II RNB family protein - fission yeast (Schizosaccharomyces pombe)	sp BAA90921 BAA9 0921 PF00773 pir T38518 T38518	92% 62.5 45% 38%	2 6 9 253	592 281 360
HMUBJ80	858497	439	HMMER 2.1.1 blastx.2	PFAM: Histone deacetylase family CDNA FLJ10328 FIS, CLONE NT2RM2000588, WEAKLY SIMILAR TO 1	PF00850 sp BAA91545 BAA9 1545	44.9 93% 88%	233 209 477	430 490 602
HE9ML74	859297	440	HMMER 2.1.1 blastx.2	PFAM: HECT-domain (ubiquitin-transferase). CG5604 PROTEIN.	PF00632 sp Q9VL06 Q9VL06	74.3 82%	705 940	914 1269

HLQAJ01	864092	441	HMMER 2.1.1 blastx.2	PFAM: Histone deacetylase family Class I histone deacetylase.	PF00850 sp AAF73076 AAF73 076 PF01557	40% 43% 24.3 100%	456 3 13 7	932 350 90 240
			HMMER 2.1.1 blastx.2	PFAM: Fumarylacetoacetate (FAA) hydrolase family conserved hypothetical protein PA0318 [imported] - Pseudomonas aeruginosa (strain PAO1)	pir G83604 G83604	55% 40%	197 12	346 188
HSLDP32	866241	442	HMMER 2.1.1 blastx.2	PFAM: Asparagine synthase asparagine synthase (glutamine-hydrolyzing) (EC 6.3.5.4) - Escherichia coli	PF00733 pir A36616 AJECN	244.9 72% 98% 87%	270	590 656 267 636
			HMMER 2.1.1 blastx.2	PFAM: Glycosyl transferases group 1 L165.1 (Fragment).	PF00534 sp AAF77213 AAF77 213 PF01344	25 40% 44% 94.1	125 50 385 283	403 409 531 423
HPMEG40	866272	443	HMMER 2.1.1 blastx.2	PFAM: Kelch motif	PF01344	94.1	283	423
			HMMER 2.1.1 blastx.2	KELCH MOTIF CONTAINING PROTEIN.	sp Q9Y2M5 Q9Y2M 5	44% 32% 43% 34% 36%	166 166 181 166 181	381 531 366 381 363
HRADE27	867195	444	HMMER 2.1.1 blastx.2					
			HMMER 2.1.1 blastx.2					
HTXQR10	869137	445	HMMER 2.1.1 blastx.2					
			HMMER 2.1.1 blastx.2					

HEQCB27	871062	446	HMMER 2.1.1 blastx.2	PFAM: RNB-like proteins	PF00773	60%	5	124
HE8AM04	871156	447	HMMER 2.1.1 blastx.2	Sequence 8 from Patent WO9950284.	sp CAC07620 CAC0 7620	64%	1	423
HSLHT48	871996	448	HMMER 2.1.1 blastx.2	PFAM: Flavon containing amine oxidase	PF01593	73.5	3	482
HS2SH70	875870	449	HMMER 2.1.1 blastx.2	R13G10.2 protein.	sp CAA84671 CAA8 4671	39%	3	509
HAOAE45	876157	450	HMMER 2.1.1 blastx.2	PFAM: Transposase	PF01811	200.5	153	500
HS2SH70	875870	449	HMMER 2.1.1 blastx.2	H repeat-associated protein homolog b0706 - Escherichia coli	pir A64806 A64806	84%	90	497
HAOAE45	876157	450	HMMER 2.1.1 blastx.2	PFAM: Histone deacetylase family	PF00850	255	361	1014
HAOAE45	876157	450	HMMER 2.1.1 blastx.2	Class I histone deacetylase.	sp AAF73076 AAF73 076	94%	313	1014
HAOAE45	876157	450	HMMER 2.1.1 blastx.2	PFAM: Riboflavin kinase / FAD synthetase	PF01687	30.3	255	341
HAOAE45	876157	450	HMMER 2.1.1 blastx.2	cDNA FLJ11149 FIS, CLONE PLACE1006731.	sp BAA92033 BAA9 2033	86%	234	458

HELBA42	878549	451	HMMER 2.1.1 blastx.2	PFAM: Acetyltransferase (GNAT) family hypothetical protein DKFZp564C103.1 - human	PF00583 pir T08699 T08699	37.5	384	560
HSPBB15	878791	452	HMMER 2.1.1 blastx.2	PFAM: GMC oxidoreductases Choline dehydrogenase (Fragment).	PF00732 sp CAB75961 CAB7 5961	100 99% 99% 88% 55% 61%	196 78 482 145 3 101	480 695 955 480 176 205
HTAFF91	879399	453	HMMER 2.1.1 blastx.2	PFAM: RNB-like proteins EXORIBONUCLEASE, VACB/RNB FAMILY.	PF00773 sp Q9PK00 Q9PK00	88 38%	9 9	404 416
HETHB58	879640	454	HMMER 2.1.1 blastx.2	PFAM: alpha/beta hydrolase fold CGI-58 PROTEIN.	PF00561 sp Q9Y369 Q9Y369	35.4 52% 56%	49 49 3	657 669 50
HGBCU40	880328	455	HMMER 2.1.1 blastx.2	PFAM: Glycosyl transferases Brain cDNA, clone MNCb-1820.	PF00535 sp BAA97985 BAA9 7985	27.2 64%	354 180	479 527
HE9PR39	882939	456	HMMER 2.1.1 blastx.2	PFAM: Sialyltransferase family ALPHA-N- ACETYLGALACTOSA MINIDE ALPHA-2,6- SIALYLTRANSFERASE 1	PF00777 sp Q64686 CAG7_R AT	37.8 56%	330 93	452 614

HTEAF36	883195	872	HMMER 2.1.1	PFAM: DNA/RNA non- specific endonuclease	PF01223	148.3	274	636
HTLGW66	883855	458	HMMER 2.1.1	PFAM: Histone deacetylase family	PF00850	48.1	264	458
			blastx.2	HISTONE DEACETYLASE 5 (HD5) (HISTONE DEACETYLASE MHDA1).	sp Q9Z2V6 HDA5_ MOUSE	59% 58% 41% 54%	3 619 903 171	605 1074 1085 236
			HMMER 2.1.1	PFAM: HECT-domain (ubiquitin-transferase).	PF00632	233.1	971	1906
HPJDV95	888844	459	blastx.2	CG4238 PROTEIN.	sp Q9VQ67 Q9VQ67	62% 27%	518 9	1906 341
HCROF75	889436	460	HMMER 2.1.1	PFAM: Isochorismatase family	PF00857	46.2	252	341
			blastx.2	hypothetical protein F35G2.2 - Caenorhabditis elegans	pir T21813 T21813	57% 48%	219 135	467 245
HDPAP15	909703	461	HMMER 2.1.1	PFAM: Glycosyl transferases group 1	PF00534	138.4	503	1051
			blastx.2	BA13B9.1 (novel protein similar to a 1	sp CAC07999 CAC0 7999	100% 85%	221 2	1120 79
HTGDH34	913378	873	HMMER 2.1.1	PFAM: Acetyltransferase (GNAT) family	PF00583	61.6	376	708
			blastx.14	(AF085355) N-terminal acetyltransferase complex ard1 subunit [Homo sapiens]	gi 5114045 gb AAD4 0190.1	86%	376	765
HPDEH29	914591	463	HMMER 2.1.1	PFAM: Myosin tail	PF01576	43.8	239	454

			blastx.2	smooth muscle myosin heavy chain isoform SMemb - human (fragment)	pir I65769 I65769	57%	61	165
HDPVG08	914973	464	HMMER 2.1.1	PFAM: UBA domain	PF00627	43.4	342	461
			blastx.2	CG13472 PROTEIN.	sp Q9VUH8 Q9VUH8	35%	1419	1712
						27%	297	854
						25%	555	860
						44%	126	212
HFXDW32	916095	465	HMMER 2.1.1	PFAM: Domain of unknown function	PF00990	70.4	464	652
			blastx.2	probable membrane protein yciR - Escherichia coli	pir H64876 H64876	76%	356	730
						64%	705	875
						30%	582	719
HSSCY03	916445	466	HMMER 2.1.1	PFAM: HECT-domain (ubiquitin-transferase).	PF00632	96.5	764	1297
			blastx.2	giant protein p619 - human	pir S71752 S71752	37%	311	1327
						62%	153	200
HFXFI49	916758	467	HMMER 2.1.1	PFAM: Isochorismatase family	PF00857	80	343	588
			blastx.2	probable membrane protein ycaC - Escherichia coli	pir S09671 S09671	100%	304	588
HTLGH72	917526	468	HMMER 2.1.1	PFAM: Peptide methionine sulfoxide reductase	PF01625	353	267	746
			blastx.2	PEPTIDE METHIONINE SULFOXIDE REDUCTASE (EC	sp Q9UJ68 Q9UJ68	99%	72	776

HSUAE63	917758	469	1.8.4.6).	PFAM: tRNA synthetase class II (G, H, P, S and T)	PF00587	340.1	926	2110
			HMMER 2.1.1 blastx.2	threonine--tRNA ligase (EC 6.1.1.3) - human	pir A38867 YSHUT	61% 39% 64%	1232 118 935	2188 891 1171
HAPTQ56	918920	470	PFAM:	Phosphotriesterase family	PF02126	433.7	1250	618
			HMMER 2.1.1 blastx.2	PHOSPHOTRIESTERASE RELATED PROTEIN (PARATHION 1)	sp Q60866 PTER_MOUSE	88%	1241	606
HAPTQ56	919863	874	PFAM:	Phosphotriesterase family	PF02126	433.7	82	714
			HMMER 2.1.1 blastx.14	parathion hydrolase (phosphotriesterase)-related protein [Mus musculus]	gi 881499 gb AAA68951.1	88%	91	726
HNFIF54	919034	471	PFAM:	FAD binding domain	PF00890	210.3	242	577
			HMMER 2.1.1 blastx.2	succinate dehydrogenase (EC 1.3.99.1) flavoprotein - Escherichia coli	pir B64808 DEECSE	92%	2	577
HSDFF02	920435	472	PFAM:	Ribonuclease T2 family	PF00445	42.9	2	151
			HMMER 2.1.1 blastx.2	Enterobacter ribonuclease (EC 3.1.27.6) I precursor - Escherichia coli	pir JQ0777 JQ0777	90% 95%	2 349	382 414
HE8NS06	921076	473	PFAM:	Acetyltransferase (GNAT) family	PF00583	42.6	555	776
			HMMER 2.1.1 blastx.2	P300/CBP-	sp Q92831 Q92831	90%	48	1025

HASBA77	921365	474	blastx.2	ASSOCIATED FACTOR.		98% 100% 45%	1060 1 129	1248 48 185
				PEPTIDE CHAIN RELEASE FACTOR 2 (RF-2).	sp Q53915 RF2_STR CO	30%	51	449
HASBA77	921366	875	HMMER 2.1.1 blastx.14	PFAM: Peptidyl-tRNA hydrolase domain	PF00472	26.5	295	435
				PrfB [Streptomyces coelicolor]	gi 1402638 dbj BAA1 3170.1	45%	247	438
HSKDP26	921831	475	HMMER 2.1.1 blastx.2	PFAM: Site-specific recombinases	PF00239	138.8	395	81
				probable resolvase b1545 - Escherichia coli	pir D64909 D64909	100% 71%	395 466	51 404
HMTAY52	921948	476	HMMER 2.1.1 blastx.2	PFAM: Flavin containing amine oxidase	PF01593	78.3	224	451
				CDNA FLJ20746 FIS, CLONE HEP06040.	sp BAA91360 BAA9 1360	94% 87% 77% 68%	125 998 883 975	880 1093 963 1022
HSDJG01	922453	477	HMMER 2.1.1 blastx.2	PFAM: HECT-domain (ubiquitin-transferase).	PF00632	105.2	121	612
				CYCLIN-E BINDING PROTEIN 1.	sp Q9UII4 Q9UII4	90% 96%	7 2	789 100
HHEPF30	928000	478	HMMER 2.1.1 blastx.2	PFAM: HECT-domain (ubiquitin-transferase).	PF00632	428	1	585
				ubiquitin ligase Nedd4 - rat (fragment)	pir S70642 S70642	95%	1	588
HTLAB16	929948	479	HMMER 2.1.1	PFAM: Flavin containing amine oxidase	PF01593	74.7	274	918

			blastx.2	CDNA FLJ20746 FIS, CLONE HEP06040.	sp BAA91360 BAA9 1360	49%	217	945
HOHCW42	930431	480	HMMER 2.1.1	PFAM: HECT-domain (ubiquitin-transferase).	PF00632	35%	1	186
			blastx.2	HYPOTHETICAL 47.0 KDA PROTEIN (FRAGMENT).	sp Q9UDU3 Q9UDU 3	236.1	2527	1634
HCHNX75	931615	481	HMMER 2.1.1	PFAM: Kelch motif	PF01344	96%	2719	1634
			blastx.2	CDNA FLJ10748 FIS, CLONE NT2RP3001819, WEAKLY SIMILAR TO 1	sp BAA91787 BAA9 1787	102.5	184	324
						49%	34	714
						27%	37	678
						27%	121	666
						29%	262	669
HBCBA92	933093	482	HMMER 2.1.1	PFAM: alpha/beta hydrolase fold	PF00561	47	1141	893
			blastx.2	Hypothetical 22.5 kDa protein.	sp CAB97209 CAB9 7209	98%	1315	806
						100%	666	592
HHFJ31	933110	483	HMMER 2.1.1	PFAM: tRNA synthetases class I (W and Y)	PF00579	153.7	123	512
			blastx.2	MITOCHONDRIAL TRYPTOPHANYL- TRNA SYNTHETASE PRECURSOR (EC 1	sp Q9UGM6 Q9UG M6	100%	15	512
						75%	494	577
						63%	577	609
HTXNN68	933670	484	HMMER 2.1.1	PFAM: Glycosyl hydrolase family 47	PF01532	540.8	1	906
			blastx.2	hypothetical protein C47E12.3 - Caenorhabditis elegans	pir T20009 T20009	64%	1	909
HWWFW06	933671	485	HMMER 2.1.1	PFAM: Glycosyl hydrolase family 47	PF01532	159.3	78	320

HE2SY77	934771	486	blastx.2	hypothetical protein C47E12.3 - Caenorhabditis elegans	pir T20009 T20009	46%	78	530
HSHCO49	934819	487	HMMER 2.1.1	PFAM: Biotin protein ligase	PF01317	115.6	24	299
			blastx.2	birA bifunctional protein [validated] - Escherichia coli	pir B24029 BVECBF	100% 100%	3 301	299 330
HMUBI13	937820	488	HMMER 2.1.1	PFAM: Putative undecaprenyl diphosphate synthase	PF01255	235.8	227	766
			blastx.2	CG10778 PROTEIN.	sp Q9W3M6 Q9W3 M6	49%	134	766
HBXGL55	938766	489	HMMER 2.1.1	PFAM: Fumarylacetoacetate (FAA) hydrolase family	PF01557	288.8	327	830
			blastx.2	Brain cDNA, clone MNCb-4134.	sp BAA95083 BAA9 5083	87%	237	899
HAFAH26	940254	490	HMMER 2.1.1	PFAM: Kelch motif	PF01344	150.2	1248	1388
			blastx.2	CDNA FLJ11078 FIS, CLONE PLACE1005102, WEAKLY SIMILAR TO 1	sp BAA91990 BAA9 1990	34% 34%	849 127	1838 756
HARMG23	942860	491	HMMER 2.1.1	PFAM: alpha/beta hydrolase fold	PF00561	25.5	469	774
			blastx.2	BEM46 PROTEIN.	sp O76462 O76462	43%	214	1050
			HMMER 2.1.1	PFAM: tRNA synthetase class II (G, H, P, S and T)	PF00587	57.9	43	507
			blastx.2	CDNA FLJ20450 FIS,	sp BAA91176 BAA9	86%	43	612

HOFMV44	943224	492	HMMER 2.1.1	CLONE KAT05607. PFAM: Kelch motif	1176	100%	3	38
			blastx.2		PF01344	294.3	863	1003
HE9CJ28	949245	493	HMMER 2.1.1	CG6224 PROTEIN.	sp Q9VUU5 Q9VUU5	43%	2	1129
			blastx.2			34%	65	1138
HE8AZ89	950713	494	HMMER 2.1.1	PFAM: ThiF family	PF00899	39%	275	1012
			blastx.2			142.6	1143	694
HFXXW94	950717	495	HMMER 2.1.1	CG1749 PROTEIN.	sp Q9VYY3 Q9VYY3	59%	1356	145
			blastx.2		PF01715	143.2	179	628
HISAF41	951370	496	HMMER 2.1.1	trna isopentenyltransferase - fission yeast (Schizosaccharomyces pombe)	pir T38664 T38664	38%	80	628
			blastx.2					
HDPJH11	951371	497	HMMER 2.1.1	PFAM: N- acetylmutamoyl-L-alanine amidase	PF01510	188.7	289	774
			blastx.2					
			HMMER 2.1.1	hypothetical protein b0868 - Escherichia coli	pir D64825 D64825	99%	1769	1050
			blastx.2			90%	2044	1718
			HMMER 2.1.1	PFAM: Glucosamine-6- phosphate isomerase	PF01182	100%	2096	2049
			blastx.2			39%	77	9
			HMMER 2.1.1	probable glucosamine-6- phosphate isomerase (EC 5.3.1.10) - golden hamster	pir S68445 S68445	253.8	1669	1331
			blastx.2			91%	1675	1232
			HMMER	PFAM: Glucosamine-6-	PF01182			
						209.4	199	504

			2.1.1	phosphate isomerase				
			blastx.2	probable glucosamine-6-phosphate isomerase (EC 5.3.1.10) - golden hamster	pir S68445 S68445	84%	130	492
HLHCP93	951372	876	HMMER 2.1.1	PFAM: Glucosamine-6-phosphate isomerase	PF01182	230.7	244	567
			blastx.2	unnamed protein product [unidentified]	emb CAA03416.1	80% 75%	244 87	699 197
HAIBC14	951671	499	HMMER 2.1.1	PFAM: Acetyltransferase (GNAT) family	PF00583	42.4	311	679
			blastx.2	Separation anxiety protein.	sp AAF34715 AAF34715	71%	299	796
HKAJZ24	951676	500	HMMER 2.1.1	PFAM: Glycosyl transferases	PF00535	74	228	779
			blastx.2	GALNAC-T5 (FRAGMENT).	sp Q9UGK7 Q9UGK7	93% 62% 81%	27 758 751	827 805 783
HWADY95	951731	501	HMMER 2.1.1	PFAM: GMC oxidoreductases	PF00732	190.1	29	433
			blastx.2	Choline dehydrogenase (Fragment).	sp CAB75961 CAB75961	100%	2	514
HCHAG27	952058	502	HMMER 2.1.1	PFAM: alpha/beta hydrolase fold	PF00561	50.8	315	521
			blastx.2	hypothetical protein R05D7.4 - Caenorhabditis elegans	pir T23932 T23932	42% 38%	785 237	1084 662
HPCRA07	952124	503	HMMER 2.1.1	PFAM: Elongation factor G C-terminus	PF00679	50.1	99	224
			blastx.2	U5-116 KDA.	sp O08810 O08810	91%	3	407
HDMAF23	952729	504	HMMER	PFAM: Transglutaminase-	PF01841	46.6	1271	1116

			2.1.1	like superfamily				
			blastx.2	PNGase (Fragment).	sp AAF74720 AAF74720	99%	1283	219
HRGBU12	952730	505	HMMER 2.1.1	PFAM: Transglutaminase-like superfamily	PF01841	39.7	144	299
			blastx.2	PNGase (Fragment).	sp AAF74720 AAF74720	98%	6	455
						53%	454	531
						62%	522	593
HADF82	953295	506	HMMER 2.1.1	PFAM: Histone deacetylase family	PF00850	309.6	118	996
			blastx.2	HISTONE DEACETYLASE 6 (HD6).	sp Q9UBN7 HDA6_HUMAN	52%	118	996
						53%	118	984
HCGAF54	954048	507	HMMER 2.1.1	PFAM: ubiE/COQ5 methyltransferase family	PF01209	133.3	217	423
			blastx.2	CG2453 PROTEIN.	sp Q9VYF8 Q9VYF8	65%	624	1028
						64%	202	432
						55%	541	600
HSLGA19	610031	508	blastx.2	glucosyltransferase (EC 2.4.1.-) I - Escherichia coli	pir B42595 B42595	96%	4	285
						100%	585	866
						100%	275	475
						90%	466	588
HSLGA19	955327	877	HMMER 2.1.1	PFAM: Glycosyl transferases group 1	PF00534	177.9	1901	1392
			blastx.2	lipopolysaccharide core biosynthesis protein [Escherichia coli]	gb AAA24082.1	98%	6	860
HWVCL36	955759	509	HMMER 2.1.1	PFAM: tRNA synthetase class II (G, H, P, S and T)	PF00587	222.3	5	610
			blastx.2	threonine--tRNA ligase	pir A38867 YSHUT	76%	2	658

HDTEN41	955895	510	HMMER 2.1.1	(EC 6.1.1.3) - human PFAM: Kelch motif	PF01344	380.6	1144	1284
HSDDDD20	956046	511	blastx.2	KEAP1 PROTEIN.	sp Q9Z2X8 Q9Z2X8	94%	169	1464
			HMMER 2.1.1	PFAM: alpha/beta hydrolase fold	PF00561	53.2	55	648
			blastx.2	probable hydrolase b1009 - Escherichia coli	pir G64842 G64842	87%	1	702
HDPBL08	959377	512	HMMER 2.1.1	PFAM: Rhodanese-like domain	PF00581	36.7	581	823
			blastx.2	hypothetical protein DKFZp762H1311.1 - human (fragment)	pir T50634 T50634	78%	521	970
HMELJ75	960354	513	HMMER 2.1.1	PFAM: Poly A polymerase family	PF01743	162.7	393	893
			blastx.2	CGI-47 PROTEIN.	sp Q9Y362 Q9Y362	95% 100%	153 1187	1187 1249
HLTCU08	960951	514	HMMER 2.1.1	PFAM: Kelch motif	PF01344	214	516	656
			blastx.2	KELCH MOTIF CONTAINING PROTEIN.	sp Q9Y2M5 Q9Y2M5	39% 37% 37% 59%	48 69 75 1	677 650 677 66
			HMMER 2.1.1	PFAM: Kelch motif	PF01344	96.6	762	634
HTOHK41	960955	515	blastx.2	LYMPHOCYTE ACTIVATION- ASSOCIATED PROTEIN.	sp Q9Y2X2 Q9Y2X2	27% 29% 25%	981 1002 1002	310 484 361
HTKAA03	961002	516	HMMER	PFAM:	PF01557	89.9	2	148

			2.1.1	Fumarylacetoacetate (FAA) hydrolase family					
			blastx.2	probable 2-hydroxyhepta-2,4-diene-1,7-dioate isomerase b1180 - Escherichia coli	pir A64864 A64864	98%	2	202	
HMSGF27	962420	517	HMMER 2.1.1	PFAM: Glycosyl hydrolase family 47	PF01532	38.1	198	323	
			blastx.2	CDNA FLJ10783 FIS, CLONE NT2RPP4000417, WEAKLY SIMILAR TO 1	sp BAA91806 BAA91806	90% 34%	204 76	332 204	
HHFLM17	963511	518	HMMER 2.1.1	PFAM: Kelch motif	PF01344	151.1	69	212	
			blastx.2	ACTIN-BINDING PROTEIN.	sp Q9Y573 Q9Y573	100% 32% 30% 30% 30% 100% 54%	3 6 3 84 228 446 452	443 440 401 377 440 490 484	
HLJCL10	964035	519	HMMER 2.1.1	PFAM: AhpC/TSA family	PF00578	247.1	108	575	
			blastx.2	ANTIOXIDANT PROTEIN 2 (EC 1.11.1.7) (24 KDA PROTEIN) 1	sp P30041 AOP2_HUMAN	100%	93	761	
HCUAZ04	965585	520	HMMER 2.1.1	PFAM: Fumarylacetoacetate (FAA) hydrolase family	PF01557	100.2	495	292	
			blastx.2	CGI-105 PROTEIN.	sp Q9Y3B0 Q9Y3B0	91%	546	214	

HE2SB11	965611	521	HMMER 2.1.1 blastx.2	PFAM: Glycosyl transferases group 1 CG11306 PROTEIN.	PF00534	33.4	160	375
HCFLJ17	954723	522	HMMER 1.8 blastx.2	PFAM: Helix-loop-helix DNA-binding domain NY-REN-6 ANTIGEN (FRAGMENT).	sp Q9VP06 Q9VP06	55%	154	438
						61%	126	164
HCFLJ17	966294	878	HMMER 2.1.1 blastx.2	PFAM: FF domain (AF155096) NY-REN-6 antigen [Homo sapiens]	PF00010	8.34	151	207
						60%	199	411
HLICJ19	966969	523	HMMER 2.1.1 blastx.2	PFAM: Acetyltransferase (GNAT) family EMeg32 protein.	sp Q9Y5A8 Q9Y5A8	94%	1	105
						63.4	174	341
HDPSM18	967483	524	HMMER 2.1.1 blastx.2	PFAM: ThiF family Ubiquitin-activating enzyme E1.	gb AAD42862.1 AF1 55096 1	99%	3	1193
						69%	1178	1216
HMAKJ82	967593	525	HMMER 2.1.1 blastx.2	PFAM: Kelch motif PFAM: Histone deacetylase family	PF00583	27.2	52	282
						71%	1	321
HFPIX37	971428	526	HMMER 2.1.1 blastx.2	PFAM: Histone deacetylase family hypothetical protein DKFZp566E044.1 - human	sp CAA04463 CAA0 4463	26.4	193	279
						38%	1	279
HHEKP47	974402	527	HMMER 2.1.1 blastx.2	PFAM: Acetyltransferase (GNAT) family	sp BAA94076 BAA9 4076	41%	246	347
						57%	407	448
HHEKP47	974402	527	HMMER 2.1.1 blastx.2	PFAM: Acetyltransferase (GNAT) family	PF01344	42.7	286	429
						30.2	4	138
HHEKP47	974402	527	HMMER 2.1.1 blastx.2	PFAM: Acetyltransferase (GNAT) family	PF00850	49%	4	258
						43%	1	255
HHEKP47	974402	527	HMMER 2.1.1 blastx.2	PFAM: Acetyltransferase (GNAT) family	pir T46284 T46284	102.6	111	497

				blastx.2	phnO protein - Escherichia coli	pir G35719 G35719	100%	96	527
HTPDV62	418671	528		HMMER 2.1.1	PFAM: Guanylate kinase	PF00625	41.6	2	109
				blastx.2	guanylate kinase (EC 2.7.4.8) 1 - human	pir S68864 S68864	100% 95%	2 200	109 268
HUSAJ73	567234	529		HMMER 2.1.1	PFAM: POLO box duplicated region.	PF00659	26.4	31	126
				blastx.2	SERUM-INDUCIBLE KINASE.	sp O60679 O60679	97% 88% 57%	31 415 488	159 492 589
HSKCJ76	747380	530		HMMER 2.1.1	PFAM: POLO box duplicated region.	PF00659	98	115	306
				blastx.2	SERUM-INDUCIBLE KINASE.	sp O60679 O60679	95% 100%	115 104	321 18
HCEOX38	881200	531		HMMER 2.1.1	PFAM: CNH domain	PF00780	68.9	105	386
				blastx.2	Misshapen/NIK-related kinase MINK-1.	sp BAA90753 BAA9 0753	95% 100%	120 3	386 53
HFICR59	911317	532		HMMER 2.1.1	PFAM: Guanylate kinase	PF00625	141.3	221	493
				blastx.2	MAGUK protein VAM-1.	sp AAD45919 AAD4 5919	100%	2	721
HPDVO67	911405	533		HMMER 2.1.1	PFAM: Guanylate kinase	PF00625	46.4	211	396
				blastx.2	ZO-3.	sp O95049 O95049	88% 59% 68% 50%	1 629 690 387	726 784 755 446
H2LAD53	952181	534		HMMER	PFAM: Guanylate kinase	PF00625	69.8	1	177

				2.1.1 blastx.2	PALS1.		sp AAF63789 AAF63789	100%			
HETLM90	954181	535		HMMER 2.1.1 blastx.2	PFAM: CNH domain		PF00780	183.7	16	711	360
					GERMINAL CENTER KINASE RELATED PROTEIN KINASE.		sp Q9Y6R5 Q9Y6R5	94%	1	771	
HCE5E94	971074	882		HMMER 2.1.1 blastx.14	PFAM: Deoxynucleoside kinase (AF087661) NADH-ubiquinone oxidoreductase 42 kDa subunit [Homo sapiens]		PF01712	62.3	423	761	
							gi 4191348 gb AAD09755.1	94%	33	1097	
HFXCU55	499457	537		HMMER 2.1.1 blastx.2	PFAM: Semialdehyde dehydrogenase aspartate-semialdehyde dehydrogenase (EC 1.2.1.11) - Escherichia coli		PF01118	54.3	147	1	
							pir A00364 DEECDA	100%	177	1	
HEPBV24	513261	538		HMMER 2.1.1 blastx.2	PFAM: Semialdehyde dehydrogenase aspartate-semialdehyde dehydrogenase (EC 1.2.1.11) - Escherichia coli		PF01118	53.4	211	378	
							pir A00364 DEECDA	89%	208	378	
HFRAU96	527840	539		HMMER 2.1.1 blastx.2	PFAM: Hydratase/decarboxylase probable hydratase (EC 4.2.1.-) mhpD -		PF01689	97.3	52	204	
							pir F64762 F64762	100% 98%	207 52	416 204	

HTLBD23	527944	540	HMMER 2.1.1 blastx.2	Escherichia coli PFAM: Domain of unknown function enterobactin synthetase component F - Escherichia coli	PF00668 pir H64791 YGECEF	56% 70%	418 2	549 52
HCEBM51	536558	541	HMMER 2.1.1 blastx.2	PFAM: Proline dehydrogenase PROLINE OXIDASE, MITOCHONDRIAL PRECURSOR (EC 1.5.3.-) 1	PF01619 sp O43272 PROD_H UMAN	77%	78	458
HSLFF79	609838	542	HMMER 2.1.1 blastx.2	PFAM: Glycosyl transferase probable undecaprenyl- phosphate 1 K-12)	PF00953 pir C65182 C65182	24.5%	88	231
HSLFF79	961693	883	HMMER 2.1.1 blastx.2	PFAM: Glycosyl transferase (AE000454) UDP- GlcNAc:undecaprenylpho sphate GlcNAc-1- phosphate 1 [Escherichia coli]	PF00953 gb AAC76789.1	20.6%	857	684
HKTAB71	661483	543	HMMER 2.1.1 blastx.2	PFAM: Glycine cleavage T-protein (aminomethyl transferase) DIMETHYLGLYCINE DEHYDROGENASE PRECURSOR (EC	PF01571 sp Q9UI17 Q9UI17	100%	152	838
						186.1	9	350
						100%	9	374

HSDIF25	678003	544	HMME 2.1.1	1.5.99.2). PFAM: Tetrahydrofolate dehydrogenase/cyclohydr olase	PF00763	282.6	51	425
			blastx.2	methylenetetrahydrofolate dehydrogenase (NADP+) (EC 1.5.1.5) 1 - Escherichia coli	pir H64784 JS0662	98% 82%	45 409	425 495
HNHHW82	684342	545	HMME 2.1.1	PFAM: Dehydratase family	PF00920	34.2	183	266
			blastx.2	probable dihydroxy-acid dehydratase yagF - Escherichia coli	pir E64752 E64752	90% 100% 70%	1 183 93	195 284 122
HFATN41	712097	546	HMME 2.1.1	PFAM: Dihydroorotate dehydrogenase	PF01180	203.7	304	690
			blastx.2	dihydroorotate oxidase (EC 1.3.3.1) - Escherichia coli	pir A23109 DEECDO	87% 95%	298 18	729 296
HHFFG80	733387	547	HMME 2.1.1	PFAM: Galactosyltransferase	PF01762	28.3	179	427
			blastx.2	T7N9.18.	sp AAF79857 AAF79 857	30%	8	478
HSDFF73	761657	548	HMME 2.1.1	PFAM: Prephenate dehydratase	PF00800	75.3	3	200
			blastx.2	chorismate mutase (EC 5.4.99.5) / prephenate dehydratase (EC 4.2.1.51) pheA [validated] - Escherichia coli	pir A30261 KMECP W	82%	3	488
HTLBH79	774422	549	HMME	PFAM:	PF01762	115.2	252	545

			2.1.1	Galactosyltransferase				
			blastx.2	GANGLIOSIDE GALACTOSYLTRANSF ERASE 1 1 1	sp O96024 O96024	98%	12	545
HTLBH79	797621	884	HMMER 2.1.1	PFAM: Galactosyltransferase	PF01762	98.5	616	356
HTLBH79	971837	885	HMMER 2.1.1	PFAM: Galactosyltransferase	PF01762	112.9	349	663
			blastx.2	(AB026730) beta 1,3- galactosyltransferase-4 [Homo sapiens]	dbj BAA88988.1	97%	340	798
HBWCD80	777346	550	HMMER 2.1.1	PFAM: Lysyl hydrolase	PF02062	45	341	568
			blastx.2	CEREBRAL CELL ADHESION MOLECULE.	sp Q9UMW5 Q9UM W5	48% 40%	146 864	937 926
HSDKI89	786812	551	HMMER 2.1.1	PFAM: Aldehyde oxidase and xanthine dehydrogenase, C terminus	PF01315	195.2	3	443
			blastx.2	probable oxidoreductase (EC 1.-.-) yagR [similarity] - Escherichia coli	pir D64754 D64754	85%	3	500
HIBDA29	810879	552	HMMER 2.1.1	PFAM: Dihydroorotase- like	PF00744	30.1	170	331
			blastx.2	Collapsin response mediator protein-5.	sp AAF80348 AAF80 348	80% 53%	26 418	460 507
HLDQU68	825558	553	HMMER 2.1.1	PFAM: Proline dehydrogenase	PF01619	92.2	46	408

HMUAS41	827510	554	blastx.2	KIDNEY AND LIVER PROLINE OXIDASE 1.	sp Q9UF12 Q9UF12	91%	1	453
HTXOH20	837509	555	HMMER 2.1.1	PFAM: NAD-dependent glycerol-3-phosphate dehydrogenase	PF01210	206.4	32	340
			blastx.2	GLYCEROL-3- PHOSPHATE DEHYDROGENASE [NAD+], CYTOPLASMIC 1	sp O57656 GPDA_F UGRU	66%	44	382
			HMMER 2.1.1	PFAM: Glycosyl hydrolases family 35	PF01301	27.7	199	294
HSLFG13	847314	556	blastx.2	CG3132 PROTEIN.	sp Q9VGE7 Q9VGE7	37%	22	405
			HMMER 2.1.1	PFAM: CoA-ligases	PF00549	200.1	274	681
			blastx.2	succinate--CoA ligase (ADP-forming) (EC 6.2.1.5) alpha chain - Escherichia coli	pir A90499 SYECSA	79% 100%	187 3	681 185
HDAAS21	850577	557	HMMER 2.1.1	PFAM: PQQ enzyme repeat	PF01011	29.2	155	268
			blastx.2	serine/threonine protein kinase related protein - 1	pir H69064 H69064	31% 28% 25%	98 77 98	703 724 724
			HMMER 2.1.1	PFAM: Pyridoxamine 5'- phosphate oxidase	PF01243	119.7	362	685
HARMH10	852701	558	blastx.2	CDNA FLJ10535 FIS, CLONE NT2RP2001070, WEAKLY SIMILAR TO 1	sp BAA91668 BAA9 1668	97% 52%	269 685	700 810

HSDAI07	859237	559	HMMER 2.1.1	PFAM: Orn/Lys/Arg decarboxylase	PF01276	377.1	123	623
			blastx.2	ornithine decarboxylase (EC 4.1.1.17), inducible - Escherichia coli	pir A40839 A40839	85% 93%	3 35	623 121
HLDQU41	864996	560	HMMER 2.1.1	PFAM: Carbon-nitrogen hydrolase	PF00795	94.1	208	486
			blastx.2	BETA- UREIDOPROPIONASE.	sp Q9UIR3 Q9UIR3	99%	1	501
HAJBU06	864997	561	HMMER 2.1.1	PFAM: Carbon-nitrogen hydrolase	PF00795	290.1	164	880
			blastx.2	BETA- UREIDOPROPIONASE.	sp Q9UBR1 Q9UBR1	98%	137	937
HSLDO63	866332	562	HMMER 2.1.1	PFAM: Glycosyl hydrolases family 31	PF01055	149.9	21	512
			blastx.2	hypothetical 77.2 kD protein in glnA-fdhE intergenic region - Escherichia coli (strain K- 12)	pir A65193 A65193	100%	3	521
HNIHAG26	866694	563	HMMER 2.1.1	PFAM: Biotin synthase	PF01792	424.2	266	775
			blastx.2	biotin synthetase (EC 2.8.1.-) - Escherichia coli	pir JC2517 SYECBB	82% 87% 86%	2 90 2	880 260 112
HBGBC61	867065	564	HMMER 2.1.1	PFAM: Bacterial Cytochrome Ubiquinol Oxidase	PF01654	39.3	339	419
			blastx.2	cytochrome d ubiquinol oxidase (EC 1.10.3.-)	pir D64809 D64809	91% 100%	196 3	336 113

HMAEM27	870252	565	HMMER 2.1.1 blastx.2	chain I - Escherichia coli		100%	339	419
				PFAM: tRNA synthetases class I (R)	PF00750	100%	116	208
				CG8097 PROTEIN.	sp Q9VXT0 Q9VXT0	81%	419	451
HEBCK42	875541	566	HMMER 2.1.1 blastx.2	PFAM: Inorganic pyrophosphatase	PF00719	24.6	531	716
				inorganic pyrophosphatase (EC 3.6.1.1) - bovine	pir A45153 A45153	31%	291	716
						69.7	317	445
HELFN03	881180	567	HMMER 2.1.1 blastx.2	PFAM: Carbon-nitrogen hydrolase	PF00795	100%	317	445
				ybeM protein - Escherichia coli	pir H64796 H64796	64.3	461	733
						93%	383	733
HKIMF95	882308	568	HMMER 2.1.1 blastx.2	PFAM: Delta 1-pyrroline- 5-carboxylate reductase	PF01089	41.1	46	222
				hypothetical protein M153.1 - Caenorhabditis elegans	pir T23765 T23765	46%	49	222
HTLHE85	883263	569	HMMER 2.1.1 blastx.2	PFAM: Dihydroorotase- like	PF00744	132.7	1	549
				Hypothetical 61.4 kDa protein.	sp CAB95124 CAB9 5124	91%	1	582
						72%	515	721
HTEOE72	886412	570	HMMER 2.1.1 blastx.2	PFAM: Fucosyl transferase	PF00852	83.4	115	498
				CG4435 PROTEIN.	sp Q9VLC1 Q9VLC1	47%	100	600
HELBN13	907599	571	HMMER 2.1.1 blastx.2	PFAM: Aconitase C- terminal domain	PF00694	178.3	330	626
				ACONITATE	sp P25516 ACO1_EC	100%	330	644

				HYDRATASE 1 (EC 4.2.1.3) (CITRATE HYDRO-LYASE 1	OLI	89%	106	354
HFUJE03	914882	572	HMMER 2.1.1 blastx.2	PFAM: RNA pseudouridylylate synthase	PF00849	46.4	1708	1352
				HYPOTHETICAL 24.4 KDA PROTEIN IN LPD 3'REGION (ORF4).	sp O66114 YLP4_ZY MMO	47%	1456	1313
						36%	1705	1565
HABGE01	915743	573	HMMER 2.1.1 blastx.2	PFAM: tRNA synthetases class II (A)	PF01411	37	164	397
				CG10802 PROTEIN.	sp Q9W4R9 Q9W4R_9	51%	41	736
HWLKM02	917409	574	HMMER 2.1.1 blastx.2	PFAM: Metallo-beta-lactamase superfamily	PF00753	48	362	739
				hydroxyacylglutathione hydrolase (EC 3.1.2.6) - rat	pir JC5826 JC5826	53%	224	901
HOVEB13	917564	575	HMMER 2.1.1 blastx.2	PFAM: Formate--tetrahydrofolate ligase	PF01268	397.5	230	904
				hypothetical protein DKFZp586G1517.1 - human (fragment)	pir T17244 T17244	100%	242	904
						55%	96	263
HE8UB94	920288	576	HMMER 2.1.1 blastx.2	PFAM: Protein-L-isoaspartate(D-aspartate) O-methyltransferase (PCMT)	PF01135	25.3	235	369
				CDNA FLJ10883 FIS, CLONE NT2RP4001946, WEAKLY SIMILAR TO 1	sp BAA91877 BAA91877	86%	211	516

HTHDJ23	921274	577	HMMER 2.1.1 blastx.2	PFAM: PQQ enzyme repeat	PF01011	32.4	1404	1505
				Genomic DNA, chromosome 5, BAC clone:F14A1.	sp BAA97455 BAA9 7455	39%	1401	1691
HWHPB72	922580	578	HMMER 2.1.1 blastx.2	PFAM: tRNA synthetases class I (R)	PF00750	55.6	499	687
				probable arginyl-trna synthetase, cytoplasmic - fission yeast (Schizosaccharomyces pombe)	pir T39985 T39985	45%	472	702
HSQFX64	922581	579	HMMER 2.1.1 blastx.2	PFAM: tRNA synthetases class I (R)	PF00750	30.8	40	288
				DJ382I10.5.1 (novel protein similar to arginyl- tRNA 1 1	sp CAB76858 CAB7 6858	93% 60%	19 329	264 412
HDABB84	922582	580	HMMER 2.1.1 blastx.2	PFAM: tRNA synthetases class I (R)	PF00750	374.8	291	1760
				DJ382I10.5.1 (novel protein similar to arginyl- tRNA 1 1	sp CAB76858 CAB7 6858	96%	594	1760
HLHFN83	924110	581	HMMER 2.1.1 blastx.2	PFAM: Short chain dehydrogenase/reductase C-terminus	PF00678	45.2	45	137
				Alcohol dehydrogenase, short chain.	sp CAB89810 CAB8 9810	98%	3	224
HPCRR26	926401	582	HMMER 2.1.1 blastx.2	PFAM: CoA-ligases	PF00549	242.6	750	295
				SUCCINYL-COA	sp Q9UNP6 Q9UNP6	78%	819	280

HCMSD61	927475	583	HMMER 2.1.1 blastx.2	SYNTHETASE ALPHA SUBUNIT (EC 6.2.1.5). PFAM: Metallo-beta- lactamase superfamily	PF00753	44.4	153	692
HCEEC58	933866	584	HMMER 2.1.1 blastx.2	lactamase superfamily CGI- hypothetical protein CGI- 83 [imported] - human PFAM: NAD-dependent glycerol-3-phosphate dehydrogenase	pir T44603 T44603 PF01210	94% 183.1	105	959
HSYAD06	935334	585	HMMER 2.1.1 blastx.2	GLYCEROL-3- PHOSPHATE DEHYDROGENASE (NAD(P)+) (FRAGMENT). PFAM: Tetrahydrofolate dehydrogenase/cyclohydr olase	sp O02855 O02855 PF00763	78% 79.1	4	324
HUSID53	943374	586	HMMER 2.1.1 blastx.2	hypothetical protein DKFZp586G1517.1 - human (fragment) PFAM: Glycosyl hydrolases family 31	pir T17244 T17244 PF01055	97% 501.7	124	747
HRGDE77	948737	587	HMMER 2.1.1 blastx.2	GLUCOSIDASE II. PFAM: Metallo-beta- lactamase superfamily Brain cDNA, clone MNCb-5687, similar to Homo sapiens 1	sp P79403 P79403 PF00753 sp BAA95092 BAA9 5092 PF01301	57% 44.3	17	958
HEGAU68	950009	588	HMMER 2.1.1	PFAM: Glycosyl hydrolases family 35		80% 132.8	8	1051
							17	385

HNGKH38	951032	589	blastx.2	CG3132 PROTEIN.	sp Q9VGE7 Q9VGE7	59%	2	196
			HMMER 2.1.1	PFAM: Delta 1-pyrroline-5-carboxylate reductase	PF01089	40%	311	496
HNHNN26	952398	590	blastx.2	CG5840 PROTEIN.	sp Q9VEJ3 Q9VEJ3	43%	12	212
			HMMER 2.1.1	PFAM: Magnesium chelatase, subunit ChII	PF01078	91.1	161	406
HTEHP64	953791	591	blastx.2	hypothetical 56.2K protein (ilvG-rnC intergenic region) - Escherichia coli	pir JQ0872 JQ0872	85%	161	406
			HMMER 2.1.1	PFAM: Asparaginase	PF01112	78%	33	158
HMIAO78	953793	592	blastx.2	asparaginase (EC 3.5.1.1) [validated] - tree lupine (fragment)	pir S22523 S22523	72%	8	40
			HMMER 2.1.1	PFAM: Asparaginase	PF01112	32.1	198	404
HFPCN94	955009	593	blastx.2	Putative l-asparaginase.	sp CAC09349 CAC09349	40%	3	281
			HMMER 2.1.1	PFAM: CDP-alcohol phosphatidyltransferase	PF01066	48%	294	497
HSLHV08	958582	594	blastx.2	DJ967N21.6 (NOVEL CDP-ALCOHOL PHOSPHATIDYLTRAN SFERASE FAMILY 1	sp Q9UJA2 Q9UJA2	58%	101	202
			HMMER 2.1.1	PFAM: Gamma-glutamyltranspeptidase	PF01019	36%	333	407
			blastx.2	Putative l-asparaginase.	sp CAC09349 CAC09349	71.3	316	486
			HMMER 2.1.1	PFAM: CDP-alcohol phosphatidyltransferase	PF01066	56%	316	486
			blastx.2	DJ967N21.6 (NOVEL CDP-ALCOHOL PHOSPHATIDYLTRAN SFERASE FAMILY 1	sp Q9UJA2 Q9UJA2	40%	162	326
			HMMER 2.1.1	PFAM: Gamma-glutamyltranspeptidase	PF01019	32%	482	577
			blastx.2	DJ967N21.6 (NOVEL CDP-ALCOHOL PHOSPHATIDYLTRAN SFERASE FAMILY 1	sp Q9UJA2 Q9UJA2	94.1	366	830
			HMMER 2.1.1	PFAM: Gamma-glutamyltranspeptidase	PF01019	77%	84	860
			blastx.2	DJ967N21.6 (NOVEL CDP-ALCOHOL PHOSPHATIDYLTRAN SFERASE FAMILY 1	sp Q9UJA2 Q9UJA2	77%	84	860
			HMMER 2.1.1	PFAM: Gamma-glutamyltranspeptidase	PF01019	30.8	77	166

				blastx.2	gamma-glutamyltransferase (EC 2.3.2.2) precursor - <i>Escherichia coli</i>	pir JV0028 EKECEX	66%	17	166
HPDVW40	961039	595		HMMER 2.1.1	PFAM: Adenylosuccinate synthetase	PF00709	458.6	6	533
				blastx.2	ADENYLOSUCCINATE SYNTHETASE, MUSCLE ISOZYME (EC 6.3.4.4) 1	sp P28650 PUA1_MOUSE	88%	3	629
HEMFC70	961963	596		HMMER 2.1.1	PFAM: Ubiquitin carboxyl-terminal hydrolase, family 1	PF01088	32.5	664	798
				blastx.2	AD-019 protein.	sp AAF67486 AAF67486	99%	217	1164
HLDOO20	910371	597		HMMER 1.8	PFAM: Core histones H2A, H2B, H3 and H4	PF00125	9.29	132	52
HLDOO20	963284	886		HMMER 2.1.1	PFAM: Urocanase	PF01175	175.9	12	1205
				blastx.14	urocanate hydratase [Trifolium repens]	gi 21965 emb CAA48765.1	32% 31% 38% 60% 24%	747 12 543 282 327	1196 269 692 326 485
HLDOO20	963655	887		HMMER 2.1.1	PFAM: Urocanase	PF01175	165	1	1188
				blastx.14	urocanate hydratase [Trifolium repens]	gi 21965 emb CAA48765.1	32% 38% 29% 60%	730 526 1 265	1179 675 252 309

HSLEP67	963505	598	HMMER 2.1.1 blastx.2	PFAM: ThiJ/PfpI family hydroxymethylpyrimidine kinase (EC 2.7.1.49) - Escherichia coli	PF01965 pir H64771 H64771	52.9	107	238
HSLEP94	964463	599	HMMER 2.1.1 blastx.2	PFAM: Asparaginase probable asparaginase (EC 3.5.1.1) ybiK - Escherichia coli	PF01112 pir D64820 D64820	543.1 94% 93%	444 441 1292	1292 1292 1336
HSENS89	964527	600	HMMER 2.1.1 blastx.2	PFAM: Formate-- tetrahydrofolate ligase hypothetical protein DKFZp586G1517.1 - human (fragment)	PF01268 pir T17244 T17244	637.3 75%	43 37	876 1050
HNTAF77	966190	601	HMMER 2.1.1 blastx.2	PFAM: Peptidyl-tRNA hydrolase aminoacyl-tRNA hydrolase (EC 3.1.1.29) - Synechocystis sp. (strain PCC 6803)	PF01195 pir S75738 S75738	100.1 52%	3 3	275 215
HBIOV48	967566	602	HMMER 2.1.1 blastx.2	PFAM: Gamma- glutamyltranspeptidase DJ18C9.2 (NOVEL GENE (LOCUS D20S101) SIMILAR TO 1 1	PF01019 sp Q9UJ14 Q9UJ14	55.3 84% 76% 55% 73%	295 148 65 6 468	450 450 154 107 530
HBGMN45	967744	603	HMMER 2.1.1 blastx.2	PFAM: Oxidoreductase family ycjS protein - Escherichia	PF01408 pir F64880 F64880	129.4 84%	2 2	454 688

HBXCE20	970889	604	HMMER 2.1.1 blastx.2	coli PFAM: MoaC family	PF01967	178.9	116	370
				molybdenum cofactor biosynthesis protein C [validated] - Escherichia coli	pir G64814 G64814	80%	44	403
HSLJU88	780811	605	HMMER 2.1.1 blastx.2	PFAM: tRNA synthetases class I (E and Q)	PF00749	26.3	448	537
				dihydroorotate oxidase (EC 1.3.3.1) - Escherichia coli	pir A23109 DEECDO	100%	449	3
HKGDQ60	863330	606	HMMER 2.1.1 blastx.2	PFAM: tRNA synthetases class I (E and Q)	PF00749	193.4	114	458
				CG4573 PROTEIN.	sp Q9VV59 Q9VV59	63% 47%	117 460	446 750
HSDKF67	933059	607	HMMER 2.1.1 blastx.2	PFAM: tRNA synthetases class I (E and Q)	PF00749	274.1	2	451
				glutamine--tRNA ligase (EC 6.1.1.18) [validated] - Escherichia coli	pir G64802 SYECQT	98%	2	451
HSLFT94	603023	608	HMMER 2.1.1 blastx.2	PFAM: PAP2 superfamily	PF01569	72.8	15	302
				phosphatidylglycerophosp hatase (EC 3.1.3.27) B - Escherichia coli	pir A30193 PAECGB	100%	3	314
HTJMD06	837603	609	HMMER 2.1.1	PFAM: Inositol polyphosphate phosphatase family, catalytic domain	PF00783	246.8	20	424

HNTBH68	851274	610	blastx.2	SYNAPTOJANIN 2 (EC 3.1.3.56) (SYNAPTIC 1 1	sp O15056 SYJ2_HU MAN	97%	14	433
			HMMER 2.1.1	PFAM: PAP2 superfamily	PF01569	100%	435	455
HMEKO39	863507	611	blastx.2	CDNA FLJ20300 FIS, CLONE HEP06465.	sp BAA91072 BAA9 1072	50.6	16	420
			HMMER 2.1.1	PFAM: PAP2 superfamily	PF01569	57%	1	540
HAABH11	965473	612	blastx.2	CDNA FLJ20300 FIS, CLONE HEP06465.	sp BAA91072 BAA9 1072	26.2	269	550
			HMMER 2.1.1	PFAM: PAP2 superfamily	PF01569	49%	2	619
HUVFZ43	910860	613	blastx.2	CG12746 PROTEIN.	sp Q9VND5 Q9VND 5	38.2	298	663
			HMMER 2.1.1	PFAM: Dual specificity phosphatase, catalytic domain	PF00782	46%	46	666
HCEPH84	910864	614	blastx.2	MAP kinase phosphatase.	sp BAA89534 BAA8 9534	164.4	6	401
			HMMER 2.1.1	PFAM: Dual specificity phosphatase, catalytic domain	PF00782	56%	3	494
HNFDO52	916260	615	blastx.2	PROTEIN PHOSPHATASE.	sp Q9UII6 Q9UII6	136.4	1158	727
			HMMER 2.1.1	PFAM: Dual specificity phosphatase, catalytic domain	PF00782	50%	1251	757
			blastx.2	dual specificity phosphoprotein phosphatase (EC 3.1.3.-) 2	pir A57126 A57126	92.1	2	358
						95%	2	130
						100%	257	358

HHEJR23	919082	616	HMMER 2.1.1	- human PFAM: Dual specificity phosphatase, catalytic domain	PF00782	52.2	426	253
HMTAX31	971343	617	blastx.2	CG10371 PROTEIN.	sp Q9VCI6 Q9VCI6	42%	774	259
			HMMER 2.1.1	PFAM: Dual specificity phosphatase, catalytic domain	PF00782	176.8	1064	651
HKIYI74	729217	618	blastx.2	Mitogen-activated protein kinase phosphatase x.	sp AAF86649 AAF86 649	100%	1073	522
			HMMER 2.1.1	PFAM: metalloproteinase family M24	PF00557	67.5	6	251
HSKEI21	760792	619	blastx.2	CG5188 PROTEIN.	sp Q9VKV9 Q9VKV 9	51% 61%	9 253	251 291
			HMMER 2.1.1	PFAM: Aminopeptidase I zinc metalloprotease (M18)	PF02127	118.8	201	398
HKAFK68	869127	620	blastx.2	ASPARTYL AMINOPEPTIDASE.	sp Q9ULA0 Q9ULA0	90%	138	473
			HMMER 2.1.1	PFAM: Aminopeptidase I zinc metalloprotease (M18)	PF02127	190.4	216	506
HSRBB92	905110	621	blastx.2	CDNA FLJ10915 FIS, CLONE OVARC1000288, WEAKLY SIMILAR TO 1	sp BAA91903 BAA9 1903	98% 92% 46%	117 529 506	506 570 589
			HMMER 2.1.1	PFAM: UBX domain	PF00789	119.9	1757	2005
			blastx.2	CGI-03 PROTEIN (FAS-	sp Q9Y2Z3 Q9Y2Z3	93%	62	2011

HWLLR80	931564	622	HMMER 2.1.1 blastx.2	ASSOCIATED FACTOR, FAF1). PFAM: Cytosol aminopeptidase family	PF00883	245.2	1	522
HWLWQ87	932577	623	HMMER 2.1.1 blastx.2	CG7340 PROTEIN. PFAM: metalloproteinase family M24	sp Q9V3D8 Q9V3D8 PF00557	69% 150	10 154	543 468
H6EEP53	942872	624	HMMER 2.1.1 blastx.2	PUTATIVE METHIONINE AMINOPEPTIDASE 1 (EC 3.4.11.18) 1 PFAM: Insulinase (Peptidase family M16)	sp P53582 AMP1_H UMAN PF00675	96% 66% 234.3	148 1 246	519 150 701
HE2KZ56	968439	625	HMMER 2.1.1 blastx.2	MITOCHONDRIAL PROCESSING PEPTIDASE ALPHA SUBUNIT 1 PFAM: metalloproteinase family M24	sp Q10713 MPPA_H UMAN PF00557	93% 88.8	60 100	1595 315
HFXHD52	883683	888	HMMER 2.1.1	X-Pro dipeptidase (EC 3.4.13.9) - Escherichia coli (strain K-12) PFAM: RNase3 domain.	pir H65189 H65189 PF00636	84% 33.6	1 13	342 207
HPMAM67	959570	889	HMMER 2.1.1	PFAM: HECT-domain (ubiquitin-transferase).	PF00632	65.3	246	440
HBXFI75	566766	628	blastx.2	transcription/repair- coupling protein - Escherichia coli	pir G64855 G64855	100% 91%	609 41	1295 601
HBXFI75	847655	892	HMMER	PFAM: DEAD/DEAH	PF00270	68.3	1624	1869

HELGM94	913938	629	2.1.1	box helicase	PFAM: Elongation factor Tu family (contains ATP/GTP binding P-loop)	PF00009	442.48	244	1344
HLJDQ52	923110	630	HMMER 1.8	blastx.2	ELONGATION FACTOR TU, MITOCHONDRIAL PRECURSOR (P43).	sp P49411 EFTU_HUMAN	89%	112	1437
HAJAW40	1219455	631	HMMER 2.1.1	blastx.2	PFAM: DEAD/DEAH box helicase	PF00270	77	405	785
HAJAW40	825697	893	HMMER 1.8	blastx.2	CG4152 PROTEIN.	sp Q9Y134 Q9Y134	63% 61%	207 790	788 930
HATAZ67	1106635	632	HMMER 1.8	blastx.2	RNA helicase Gu - human (fragment)	pir PC6010 PC6010	66% 22%	470 233	2122 556
HATAZ67	908326	894	HMMER 1.8	blastx.2	PFAM: DEAD and DEAH box helicases	PF00270	57.85	490	702
HBUAC02	1220017	633	HMMER 1.8	blastx.2	RNA helicase - mouse	pir I49731 I49731	59%	182	688
HBUAC02	933546	895	HMMER 1.8	blastx.2	PFAM: DEAD and DEAH box helicases	PF00270	159.42	309	803
HBUAC02	1220017	633	HMMER 1.8	blastx.2	RNA helicase [Mus musculus]	gi 407992 gb AAA53629.1	69% 50%	177 799	788 852
HBUAC02	933546	895	HMMER 1.8	blastx.2	Phorbol I protein.	sp AAF86650 AAF86650	94% 100%	99 611	650 976
HBUAC02	933546	895	HMMER 1.8	blastx.2	PFAM: Cytidine and deoxycytidylate deaminases zinc-binding region	PF00383	24.31	294	416
HBUAC02	933546	895	HMMER 1.8	blastx.2	(AL022318) bK150C2.3 (PUTATIVE novel protein 1 Phorbol) [Homo sapiens]	gi 5102832 emb CAB45271.1	100%	57	599

HCWEQ14	1117318	634	blastx.2	CDNA FLJ10432 FIS, CLONE NT2RP1000470, WEAKLY SIMILAR TO 1	sp BAA91606 BAA9 1606	100% 66%	43 5	177 40
HCWEQ14	908245	896	HMMER 1.8 blastx.14	PFAM: DEAD and DEAH box helicases (AC002985) R27090_2 [Homo sapiens]	PF00270	72.08	37	177
HDPWH41	1228148	635	blastx.2	CG9630 PROTEIN.	gi 2443870 gb AAB8 1544.1	100% 66%	37 5	177 40
HDPWH41	772569	897	HMMER 1.8	PFAM: DEAD and DEAH box helicases	sp Q9VHU1 Q9VHU 1	49% 51%	94 618	615 1079
HDQEH61	1213567	636	blastx.2	DEAD-BOX PROTEIN.	PF00270	129.65	28	333
HDQEH61	908303	898	HMMER 1.8 blastx.14	PFAM: DEAD and DEAH box helicases (AF106019) DEAD-box protein [Homo sapiens]	sp Q9Y659 Q9Y659	92% 71%	163 863	915 904
HDTDD72	587710	637	HMMER 1.8 blastx.2	PFAM: ATP synthase A chain H+-transporting ATP synthase (EC 3.6.1.34) protein 6 - 1	PF00119	181.89	221	760
HFRBN02	1152485	638	blastx.2	H+-transporting ATP synthase (EC 3.6.1.34) alpha chain - Escherichia coli	gi 5359631 gb AAD4 2744.1 AF106019_1	97% 71%	62 762	763 803
HFRBN02	973667	899	HMMER 1.8 blastx.14	PFAM: ATP synthase alpha and beta subunits papA [Escherichia coli]	pir F59153 F59153	85.33	165	350
					pir G65176 PWECA	66% 86%	3 356	347 400
					pir G65176 PWECA	93%	2	967
HFRBN02	973667	899	HMMER 1.8 blastx.14	PFAM: ATP synthase alpha and beta subunits papA [Escherichia coli]	PF00006	159.91	65	403
					gi 42283 emb CAA23	86%	2	403

HKAIH72	1107045	639	blastx.2	DNA POLYMERASE THETA (EC 2.7.7.7) (DNA POLYMERASE ETA).	sp O75417 DPOQ_H UMAN	100% 40%	406 574	651 633
HKAIH72	761293	900	HMMER 1.8	PFAM: DNA polymerase family A	PF00476	90.98	55	522
HMAAD90	1152487	640	blastx.2	NADH dehydrogenase (ubiquinone) (EC 1.6.5.3) chain NDUF3 - human	pir JE0379 JE0379	100%	8	250
HMAAD90	963983	901	HMMER 2.1.1	PFAM: ATP:guano phosphotransferase	PF00217	932.7	1352	180
HMABQ71	1105540	641	blastx.14	sarcomeric mitochondrial creatine kinase precursor (EC 2.7.3.2) [Homo sapiens]	gi 338237 gb AAA60 561.1	100% 100%	1199 1427	171 1392
HMABQ71	729831	902	blastx.2	DNA GYRASE SUBUNIT B (EC 5.99.1.3).	sp P06982 GYRB_E COLI	95% 96% 52%	317 562 70	60 308 2
HPJEV95	929723	903	HMMER 2.1.1	PFAM: DNA topoisomerase II (N- terminal region)	PF00204	128.8	210	407
HSKYR59	1219545	643	HMMER 1.8	PFAM: ATP synthase A chain	PF00119	20.61	169	393
HSKYR59	933750	904	blastx.2	H+-transporting ATP synthase (EC 3.6.1.34) delta chain precursor - human	pir S22348 S22348	90%	639	181
HSKYR59	933750	904	HMMER	PFAM: ATP synthase,	PF00401	116.4	13	342

HSWAM16	1151512	644	2.1.1 blastx.2	Delta/Epsilon chain H+-transporting ATP synthase (EC 3.6.1.34) delta chain precursor - human	pir S22348 S22348	90%	146	604
HSWAM16	933749	905	HMMER 2.1.1 blastx.14	PFAM: ATP synthase, Delta/Epsilon chain	PF00401	148.1	206	586
HSXCW82	1164013	645	blastx.2	H(+)-transporting ATP synthase [Homo sapiens]	gi 12586 emb CAA45 016.1	90%	146	604
HSXCW82	739372	906	HMMER 1.8	DEAD-BOX PROTEIN ABSTRAKT HOMOLOG.	sp Q9UJV9 ABS_HU MAN	96% 85%	147 7	1442 48
HSYDB42	933545	646	HMMER 1.8	PFAM: DEAD and DEAH box helicases	PF00270	92.34	142	387
HTXKJ79	1193059	647	blastx.2	PFAM: Cytidine and deoxycytidylate deaminases zinc-binding region	PF00383	24.68	257	379
HTXKJ79	938963	907	HMMER 1.8 blastx.14	Phorbol I protein. H+-transporting ATP synthase (EC 3.6.1.34) lipid-binding protein P3 precursor, mitochondrial - human	sp AAF86650 AAF86 650 pir I38612 I38612	94% 100% 80% 84%	62 574 107 1055	613 939 421 1186
HTXKJ79	938963	907	HMMER 1.8 blastx.14	PFAM: ATP synthase subunit C mitochondrial ATP synthase subunit 9 precursor [Homo sapiens]	PF00137 gi 511450 gb AAA78 807.1	38.73 80%	312 108	422 422

HUSGQ19	1165320	648	blastx.2	CG9630 PROTEIN.	sp Q9VHU1 Q9VHU1	48% 49% 46% 25%	559 35 1205 1413	1221 556 1411 1508
HUSGQ19	772568	908	HMMER 1.8	PFAM: DEAD and DEAH box helicases	PF00270	151.79	77	484
HUSZS75	1193982	649	blastx.2	CDNA FLJ11282 FIS, CLONE PLACE1009476, WEAKLY SIMILAR TO 1	sp BAA92106 BAA92106	100% 100% 100%	238 31 459	459 153 518
HUSZS75	908443	909	HMMER 1.8	PFAM: DEAD and DEAH box helicases	PF00270	93.7	505	792
			blastx.14	(AC004531) Gene with similarity to DEAD box helicases [Homo sapiens]	gi 3337394 gb AAC27435.1	90% 88% 100% 97% 44%	1046 319 780 112 1634	1729 780 1115 234 1687
HWBDR25	1174365	650	blastx.2	probable RNA helicase - human	pir T08745 T08745	97%	12	1220
HWBDR25	659873	910	HMMER 1.8	PFAM: DEAD and DEAH box helicases	PF00270	170.59	24	416
HBGSS51	954855	651	HMMER 2.1.1	PFAM: Cytidine and deoxycytidylate deaminase zinc-binding region	PF00383	34	66	173
			blastx.14	(AL117202) predicted using Genefinder; preliminary 1	gi 5832838 emb CAB55073.1	56% 41%	75 216	206 266

[51] Table 2 further characterizes certain encoded polypeptides of the invention, by providing the results of comparisons to protein and protein family databases. The first column provides a unique clone identifier, "Clone ID NO:", corresponding to a cDNA clone disclosed in Table 1A. The second column provides the unique contig identifier, "Contig ID:" which allows correlation with the information in Table 1A. The third column provides the sequence identifier, "SEQ ID NO:", for the contig polynucleotide sequences. The fourth column provides the analysis method by which the homology/identity disclosed in the Table was determined. The fifth column provides a description of the PFAM/NR hit identified by each analysis. Column six provides the accession number of the PFAM/NR hit disclosed in the fifth column. Column seven, score/percent identity, provides a quality score or the percent identity, of the hit disclosed in column five. Comparisons were made between polypeptides encoded by polynucleotides of the invention and a non-redundant protein database (herein referred to as "NR"), or a database of protein families (herein referred to as "PFAM"), as described below.

[52] The NR database, which comprises the NBRF PIR database, the NCBI GenPept database, and the SIB SwissProt and TrEMBL databases, was made non-redundant using the computer program nrdb2 (Warren Gish, Washington University in Saint Louis). Each of the polynucleotides shown in Table 1A, column 3 (e.g., SEQ ID NO:X or the 'Query' sequence) was used to search against the NR database. The computer program BLASTX was used to compare a 6-frame translation of the Query sequence to the NR database (for information about the BLASTX algorithm please see Altschul et al., J. Mol. Biol. 215:403-410 (1990); and Gish and States, Nat. Genet. 3:266-272 (1993). A description of the sequence that is most similar to the Query sequence (the highest scoring 'Subject') is shown in column five of Table 2 and the database accession number for that sequence is provided in column six. The highest scoring 'Subject' is reported in Table 2 if (a) the estimated probability that the match occurred by chance alone is less than $1.0e-07$, and (b) the match was not to a known repetitive element. BLASTX returns alignments of short polypeptide segments of the Query and Subject sequences which share a high degree of similarity; these segments are known as High-Scoring Segment Pairs or HSPs. Table 2 reports the degree of similarity between the Query and the Subject for each HSP as a percent identity in Column 7. The percent identity is determined by dividing the number of exact matches between the two aligned sequences in the HSP, dividing by the number of Query amino acids in the HSP

and multiplying by 100. The polynucleotides of SEQ ID NO:X which encode the polypeptide sequence that generates an HSP are delineated by columns 8 and 9 of Table 2.

[53] The PFAM database, PFAM version 2.1, (Sonnhammer et al., Nucl. Acids Res., 26:320-322, 1998)) consists of a series of multiple sequence alignments; one alignment for each protein family. Each multiple sequence alignment is converted into a probability model called a Hidden Markov Model, or HMM, that represents the position-specific variation among the sequences that make up the multiple sequence alignment (see, e.g., Durbin et al., *Biological sequence analysis: probabilistic models of proteins and nucleic acids*, Cambridge University Press, 1998 for the theory of HMMs). The program HMMER version 1.8 (Sean Eddy, Washington University in Saint Louis) was used to compare the predicted protein sequence for each Query sequence (SEQ ID NO:Y in Table 1A) to each of the HMMs derived from PFAM version 2.1. A HMM derived from PFAM version 2.1 was said to be a significant match to a polypeptide of the invention if the score returned by HMMER 1.8 was greater than 0.8 times the HMMER 1.8 score obtained with the most distantly related known member of that protein family. The description of the PFAM family which shares a significant match with a polypeptide of the invention is listed in column 5 of Table 2, and the database accession number of the PFAM hit is provided in column 6. Column 7 provides the score returned by HMMER version 1.8 for the alignment. Columns 8 and 9 delineate the polynucleotides of SEQ ID NO:X which encode the polypeptide sequence which show a significant match to a PFAM protein family.

[54] As mentioned, columns 8 and 9 in Table 2, "NT From" and "NT To", delineate the polynucleotides of "SEQ ID NO:X" that encode a polypeptide having a significant match to the PFAM/NR database as disclosed in the fifth column. In one embodiment, the invention provides a protein comprising, or alternatively consisting of, a polypeptide encoded by the polynucleotides of SEQ ID NO:X delineated in columns 8 and 9 of Table 2. Also provided are polynucleotides encoding such proteins, and the complementary strand thereto.

[55] The nucleotide sequence SEQ ID NO:X and the translated SEQ ID NO:Y are sufficiently accurate and otherwise suitable for a variety of uses well known in the art and described further below. For instance, the nucleotide sequences of SEQ ID NO:X are useful for designing nucleic acid hybridization probes that will detect nucleic acid sequences contained in SEQ ID NO:X or the cDNA contained in Clone ID NO:Z. These probes will also hybridize to nucleic acid molecules in biological samples, thereby enabling

immediate applications in chromosome mapping, linkage analysis, tissue identification and/or typing, and a variety of forensic and diagnostic methods of the invention. Similarly, polypeptides identified from SEQ ID NO:Y may be used to generate antibodies which bind specifically to these polypeptides, or fragments thereof, and/or to the polypeptides encoded by the cDNA clones identified in, for example, Table 1A.

[56] Nevertheless, DNA sequences generated by sequencing reactions can contain sequencing errors. The errors exist as misidentified nucleotides, or as insertions or deletions of nucleotides in the generated DNA sequence. The erroneously inserted or deleted nucleotides cause frame shifts in the reading frames of the predicted amino acid sequence. In these cases, the predicted amino acid sequence diverges from the actual amino acid sequence, even though the generated DNA sequence may be greater than 99.9% identical to the actual DNA sequence (for example, one base insertion or deletion in an open reading frame of over 1000 bases).

[57] Accordingly, for those applications requiring precision in the nucleotide sequence or the amino acid sequence, the present invention provides not only the generated nucleotide sequence identified as SEQ ID NO:X, and a predicted translated amino acid sequence identified as SEQ ID NO:Y, but also a sample of plasmid DNA containing cDNA Clone ID NO:Z (deposited with the ATCC on October 5, 2000, and receiving ATCC designation numbers PTA 2574 and PTA 2575; deposited with the ATCC on January 5, 2001, and having depositor reference numbers TS-1, TS-2, AC-1, and AC-2; and/or as set forth, for example, in Table 1A, 6 and 7). The nucleotide sequence of each deposited clone can readily be determined by sequencing the deposited clone in accordance with known methods. Further, techniques known in the art can be used to verify the nucleotide sequences of SEQ ID NO:X.

[58] The predicted amino acid sequence can then be verified from such deposits. Moreover, the amino acid sequence of the protein encoded by a particular clone can also be directly determined by peptide sequencing or by expressing the protein in a suitable host cell containing the deposited human cDNA, collecting the protein, and determining its sequence.

RACE Protocol For Recovery of Full-Length Genes

[59] Partial cDNA clones can be made full-length by utilizing the rapid amplification of cDNA ends (RACE) procedure described in Frohman, M.A., et al., Proc. Nat'l. Acad.

Sci. USA, 85:8998-9002 (1988). A cDNA clone missing either the 5' or 3' end can be reconstructed to include the absent base pairs extending to the translational start or stop codon, respectively. In some cases, cDNAs are missing the start codon of translation, therefor. The following briefly describes a modification of this original 5' RACE procedure. Poly A⁺ or total RNA is reverse transcribed with Superscript II (Gibco/BRL) and an antisense or complementary primer specific to the cDNA sequence. The primer is removed from the reaction with a Microcon Concentrator (Amicon). The first-strand cDNA is then tailed with dATP and terminal deoxynucleotide transferase (Gibco/BRL). Thus, an anchor sequence is produced which is needed for PCR amplification. The second strand is synthesized from the dA-tail in PCR buffer, Taq DNA polymerase (Perkin-Elmer Cetus), an oligo-dT primer containing three adjacent restriction sites (XhoI, SalI and ClaI) at the 5' end and a primer containing just these restriction sites. This double-stranded cDNA is PCR amplified for 40 cycles with the same primers as well as a nested cDNA-specific antisense primer. The PCR products are size-separated on an ethidium bromide-agarose gel and the region of gel containing cDNA products the predicted size of missing protein-coding DNA is removed. cDNA is purified from the agarose with the Magic PCR Prep kit (Promega), restriction digested with XhoI or SalI, and ligated to a plasmid such as pBluescript SKII (Stratagene) at XhoI and EcoRV sites. This DNA is transformed into bacteria and the plasmid clones sequenced to identify the correct protein-coding inserts. Correct 5' ends are confirmed by comparing this sequence with the putatively identified homologue and overlap with the partial cDNA clone. Similar methods known in the art and/or commercial kits are used to amplify and recover 3' ends.

[60] Several quality-controlled kits are commercially available for purchase. Similar reagents and methods to those above are supplied in kit form from Gibco/BRL for both 5' and 3' RACE for recovery of full length genes. A second kit is available from Clontech which is a modification of a related technique, SLIC (single-stranded ligation to single-stranded cDNA), developed by Dumas et al., Nucleic Acids Res., 19:5227-32 (1991). The major differences in procedure are that the RNA is alkaline hydrolyzed after reverse transcription and RNA ligase is used to join a restriction site-containing anchor primer to the first-strand cDNA. This obviates the necessity for the dA-tailing reaction which results in a polyT stretch that is difficult to sequence past.

[61] An alternative to generating 5' or 3' cDNA from RNA is to use cDNA library double-stranded DNA. An asymmetric PCR-amplified antisense cDNA strand is

synthesized with an antisense cDNA-specific primer and a plasmid-anchored primer. These primers are removed and a symmetric PCR reaction is performed with a nested cDNA-specific antisense primer and the plasmid-anchored primer.

RNA Ligase Protocol For Generating The 5' or 3' End Sequences To Obtain Full Length Genes

[62] Once a gene of interest is identified, several methods are available for the identification of the 5' or 3' portions of the gene which may not be present in the original cDNA plasmid. These methods include, but are not limited to, filter probing, clone enrichment using specific probes and protocols similar and identical to 5' and 3' RACE. While the full length gene may be present in the library and can be identified by probing, a useful method for generating the 5' or 3' end is to use the existing sequence information from the original cDNA to generate the missing information. A method similar to 5' RACE is available for generating the missing 5' end of a desired full-length gene. (This method was published by Fromont-Racine et al., Nucleic Acids Res., 21(7):1683-1684 (1993)). Briefly, a specific RNA oligonucleotide is ligated to the 5' ends of a population of RNA presumably containing full-length gene RNA transcript and a primer set containing a primer specific to the ligated RNA oligonucleotide and a primer specific to a known sequence of the gene of interest, is used to PCR amplify the 5' portion of the desired full length gene which may then be sequenced and used to generate the full length gene. This method starts with total RNA isolated from the desired source, poly A RNA may be used but is not a prerequisite for this procedure. The RNA preparation may then be treated with phosphatase if necessary to eliminate 5' phosphate groups on degraded or damaged RNA which may interfere with the later RNA ligase step. The phosphatase if used is then inactivated and the RNA is treated with tobacco acid pyrophosphatase in order to remove the cap structure present at the 5' ends of messenger RNAs. This reaction leaves a 5' phosphate group at the 5' end of the cap cleaved RNA which can then be ligated to an RNA oligonucleotide using T4 RNA ligase. This modified RNA preparation can then be used as a template for first strand cDNA synthesis using a gene specific oligonucleotide. The first strand synthesis reaction can then be used as a template for PCR amplification of the desired 5' end using a primer specific to the ligated RNA oligonucleotide and a primer specific to the known sequence of the gene of interest. The resultant product is then sequenced and analyzed to confirm that the 5' end sequence belongs to the relevant gene.

[63] The present invention also relates to vectors or plasmids which include such DNA sequences, as well as the use of the DNA sequences. The material deposited with the ATCC (deposited with the ATCC on October 5, 2000, and receiving ATCC designation numbers PTA 2574 and PTA 2575; deposited with the ATCC on January 5, 2001, and receiving ATCC designation numbers TS-1, TS-2, AC-1, and AC-2; and/or as set forth, for example, in Table 1A, Table 6, or Table 7) is a mixture of cDNA clones derived from a variety of human tissue and cloned in either a plasmid vector or a phage vector, as described, for example, in Table 7. These deposits are referred to as "the deposits" herein. The tissues from which some of the clones were derived are listed in Table 7, and the vector in which the corresponding cDNA is contained is also indicated in Table 7. The deposited material includes cDNA clones corresponding to SEQ ID NO:X described, for example, in Table 1A (Clone ID NO:Z). A clone which is isolatable from the ATCC Deposits by use of a sequence listed as SEQ ID NO:X, may include the entire coding region of a human gene or in other cases such clone may include a substantial portion of the coding region of a human gene. Furthermore, although the sequence listing may in some instances list only a portion of the DNA sequence in a clone included in the ATCC Deposits, it is well within the ability of one skilled in the art to sequence the DNA included in a clone contained in the ATCC Deposits by use of a sequence (or portion thereof) described in, for example Tables 1A or 2 by procedures hereinafter further described, and others apparent to those skilled in the art.

[64] Also provided in Table 7 is the name of the vector which contains the cDNA clone. Each vector is routinely used in the art. The following additional information is provided for convenience.

[65] Vectors Lambda Zap (U.S. Patent Nos. 5,128,256 and 5,286,636), Uni-Zap XR (U.S. Patent Nos. 5,128,256 and 5,286,636), Zap Express (U.S. Patent Nos. 5,128,256 and 5,286,636), pBluescript (pBS) (Short, J. M. et al., *Nucleic Acids Res.* 16:7583-7600 (1988); Alting-Mees, M. A. and Short, J. M., *Nucleic Acids Res.* 17:9494 (1989)) and pBK (Alting-Mees, M. A. et al., *Strategies* 5:58-61 (1992)) are commercially available from Stratagene Cloning Systems, Inc., 11011 N. Torrey Pines Road, La Jolla, CA, 92037. pBS contains an ampicillin resistance gene and pBK contains a neomycin resistance gene. Phagemid pBS may be excised from the Lambda Zap and Uni-Zap XR vectors, and phagemid pBK may be excised from the Zap Express vector. Both phagemids may be transformed into *E. coli* strain XL-1 Blue, also available from Stratagene.

[66] Vectors pSport1, pCMVSPORT 1.0, pCMVSPORT 2.0 and pCMVSPORT 3.0, were obtained from Life Technologies, Inc., P. O. Box 6009, Gaithersburg, MD 20897. All Sport vectors contain an ampicillin resistance gene and may be transformed into *E. coli* strain DH10B, also available from Life Technologies. See, for instance, Gruber, C. E., et al., *Focus* 15:59- (1993). Vector lacmid BA (Bento Soares, Columbia University, New York, NY) contains an ampicillin resistance gene and can be transformed into *E. coli* strain XL-1 Blue. Vector pCR[®]2.1, which is available from Invitrogen, 1600 Faraday Avenue, Carlsbad, CA 92008, contains an ampicillin resistance gene and may be transformed into *E. coli* strain DH10B, available from Life Technologies. See, for instance, Clark, J. M., *Nuc. Acids Res.* 16:9677-9686 (1988) and Mead, D. et al., *Bio/Technology* 9: (1991).

[67] The present invention also relates to the genes corresponding to SEQ ID NO:X, SEQ ID NO:Y, and/or the deposited clone (Clone ID NO:Z). The corresponding gene can be isolated in accordance with known methods using the sequence information disclosed herein. Such methods include preparing probes or primers from the disclosed sequence and identifying or amplifying the corresponding gene from appropriate sources of genomic material.

[68] Also provided in the present invention are allelic variants, orthologs, and/or species homologs. Procedures known in the art can be used to obtain full-length genes, allelic variants, splice variants, full-length coding portions, orthologs, and/or species homologs of genes corresponding to SEQ ID NO:X or the complement thereof, polypeptides encoded by genes corresponding to SEQ ID NO:X or the complement thereof, and/or the cDNA contained in Clone ID NO:Z, using information from the sequences disclosed herein or the clones deposited with the ATCC. For example, allelic variants and/or species homologs may be isolated and identified by making suitable probes or primers from the sequences provided herein and screening a suitable nucleic acid source for allelic variants and/or the desired homologue.

[69] The polypeptides of the invention can be prepared in any suitable manner. Such polypeptides include isolated naturally occurring polypeptides, recombinantly produced polypeptides, synthetically produced polypeptides, or polypeptides produced by a combination of these methods. Means for preparing such polypeptides are well understood in the art.

[70] The polypeptides may be in the form of the secreted protein, including the mature form, or may be a part of a larger protein, such as a fusion protein (see below). It is often

advantageous to include an additional amino acid sequence which contains secretory or leader sequences, pro-sequences, sequences which aid in purification, such as multiple histidine residues, or an additional sequence for stability during recombinant production.

[71] The polypeptides of the present invention are preferably provided in an isolated form, and preferably are substantially purified. A recombinantly produced version of a polypeptide, including the secreted polypeptide, can be substantially purified using techniques described herein or otherwise known in the art, such as, for example, by the one-step method described in Smith and Johnson, *Gene* 67:31-40 (1988). Polypeptides of the invention also can be purified from natural, synthetic or recombinant sources using techniques described herein or otherwise known in the art, such as, for example, antibodies of the invention raised against the polypeptides of the present invention in methods which are well known in the art.

[72] The present invention provides a polynucleotide comprising, or alternatively consisting of, the nucleic acid sequence of SEQ ID NO:X, and/or the cDNA sequence contained in Clone ID NO:Z. The present invention also provides a polypeptide comprising, or alternatively, consisting of, the polypeptide sequence of SEQ ID NO:Y, a polypeptide encoded by SEQ ID NO:X or a complement thereof, a polypeptide encoded by the cDNA contained in Clone ID NO:Z, and/or the polypeptide sequence encoded by a nucleotide sequence in SEQ ID NO:B as defined in column 6 of Table 1B. Polynucleotides encoding a polypeptide comprising, or alternatively consisting of the polypeptide sequence of SEQ ID NO:Y, a polypeptide encoded by SEQ ID NO:X, a polypeptide encoded by the cDNA contained in Clone ID NO:Z, and/or a polypeptide sequence encoded by a nucleotide sequence in SEQ ID NO:B as defined in column 6 of Table 1B are also encompassed by the invention. The present invention further encompasses a polynucleotide comprising, or alternatively consisting of, the complement of the nucleic acid sequence of SEQ ID NO:X, a nucleic acid sequence encoding a polypeptide encoded by the complement of the nucleic acid sequence of SEQ ID NO:X, and/or the cDNA contained in Clone ID NO:Z.

[73] Moreover, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in Table 1B column 6, or any combination thereof. Additional, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the complementary strand(s) of the sequences delineated in Table 1B column 6, or any

combination thereof. In further embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in Table 1B, column 6, and have a nucleic acid sequence which is different from that of the BAC fragment having the sequence disclosed in SEQ ID NO:B (see Table 1B, column 5). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in Table 1B, column 6, and have a nucleic acid sequence which is different from that published for the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in Table 1B, column 6, and have a nucleic acid sequence which is different from that contained in the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides and polypeptides are also encompassed by the invention.

[74] Further, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1), or any combination thereof. Additional, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the complementary strand(s) of the sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1), or any combination thereof. In further embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1) and have a nucleic acid sequence which is different from that of the BAC fragment having the sequence disclosed in SEQ ID NO:B (see Table 1B, column 5). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1) and have a nucleic acid sequence which is different from that published for the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated

in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1) and have a nucleic acid sequence which is different from that contained in the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides and polypeptides are also encompassed by the invention.

[75] Further, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in column 6 of Table 1B which correspond to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2), or any combination thereof. Additional, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the complementary strand(s) of the sequences delineated in column 6 of Table 1B which correspond to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2), or any combination thereof. In further embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in column 6 of Table 1B which correspond to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2) and have a nucleic acid sequence which is different from that of the BAC fragment having the sequence disclosed in SEQ ID NO:B (see Table 1B, column 5). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in column 6 of Table 1B which correspond to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2) and have a nucleic acid sequence which is different from that published for the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in column 6 of Table 1B which correspond to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2) and have a nucleic acid sequence which is different from that contained in the BAC clone identified as BAC ID NO:A (See Table 1B, column 4). Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides and polypeptides are also encompassed by the invention.

[76] Moreover, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in the same row of Table 1B column 6, or any combination thereof. Additional, representative examples of polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the complementary strand(s) of the sequences delineated in the same row of Table 1B column 6, or any combination thereof. In preferred embodiments, the polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the complementary strand(s) of the sequences delineated in the same row of Table 1B column 6, wherein sequentially delineated sequences in the table (i.e. corresponding to those exons located closest to each other) are directly contiguous in a 5' to 3' orientation. In further embodiments, above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in the same row of Table 1B, column 6, and have a nucleic acid sequence which is different from that of the BAC fragment having the sequence disclosed in SEQ ID NO:B (see Table 1B, column 5). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in the same row of Table 1B, column 6, and have a nucleic acid sequence which is different from that published for the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated in the same row of Table 1B, column 6, and have a nucleic acid sequence which is different from that contained in the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[77] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in column 6 of Table 1B, and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1B, column 2) or fragments or variants thereof. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[78] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1), and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1A or 1B) or fragments or variants thereof. In preferred embodiments, the delineated sequence(s) and polynucleotide sequence of SEQ ID NO:X correspond to the same Clone ID NO:Z. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[79] In further specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more of the sequences delineated in the same row of column 6 of Table 1B, and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1A or 1B) or fragments or variants thereof. In preferred embodiments, the delineated sequence(s) and polynucleotide sequence of SEQ ID NO:X correspond to the same row of column 6 of Table 1B. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[80] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of the sequence of SEQ ID NO:X are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[81] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of a fragment or variant of the sequence of SEQ ID NO:X are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent

hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids; other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[82] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of the sequence of SEQ ID NO:X and the 5' 10 polynucleotides of the sequence of one of the sequences delineated in column 6 of Table 1B are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[83] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of a fragment or variant of the sequence of SEQ ID NO:X and the 5' 10 polynucleotides of the sequence of one of the sequences delineated in column 6 of Table 1B are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides, are also encompassed by the invention.

[84] In further specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of another sequence in column 6 are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization

conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[85] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of another sequence in column 6 corresponding to the same Clone ID NO:Z (see Table 1B, column 1) are directly contiguous. Nucleic acids which hybridize to the complement of these 20 lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[86] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, a polynucleotide sequence in which the 3' 10 polynucleotides of one sequence in column 6 corresponding to the same contig sequence identifier SEQ ID NO:X (see Table 1B, column 2) are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[87] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of another sequence in column 6 corresponding to the same row are directly contiguous. In preferred embodiments, the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B is directly contiguous with the 5' 10 polynucleotides of the next

sequential exon delineated in Table 1B, column 6. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[88] Many polynucleotide sequences, such as EST sequences, are publicly available and accessible through sequence databases and may have been publicly available prior to conception of the present invention. Preferably, such related polynucleotides are specifically excluded from the scope of the present invention. Accordingly, for each contig sequence (SEQ ID NO:X) listed in the fourth column of Table 1A, preferably excluded are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a is any integer between 1 and the final nucleotide minus 15 of SEQ ID NO:X, b is an integer of 15 to the final nucleotide of SEQ ID NO:X, where both a and b correspond to the positions of nucleotide residues shown in SEQ ID NO:X, and where b is greater than or equal to a + 14. More specifically, preferably excluded are one or more polynucleotides comprising a nucleotide sequence described by the general formula of a-b, where a and b are integers as defined in columns 4 and 5, respectively, of Table 3. In specific embodiments, the polynucleotides of the invention do not consist of at least one, two, three, four, five, ten, or more of the specific polynucleotide sequences referenced by the Genbank Accession No. as disclosed in column 6 of Table 3 (including for example, published sequence in connection with a particular BAC clone). In further embodiments, preferably excluded from the invention are the specific polynucleotide sequence(s) contained in the clones corresponding to at least one, two, three, four, five, ten, or more of the available material having the accession numbers identified in the sixth column of this Table (including for example, the actual sequence contained in an identified BAC clone). In no way is this listing meant to encompass all of the sequences which may be excluded by the general formula, it is just a representative example. All references available through these accessions are hereby incorporated by reference in their entirety.

TABLE 3

Clone ID NO: Z	SEQ ID NO: X	Contig ID:	EST Disclaimer		Accession #'s
			Range of a	Range of b	
HHMMC14	11	1152250	1 - 1314	15 - 1328	AI086374, AI985881, AI760724, AW025363, AI744911, AI417334, AI608898, AI185630, AI086397, AI419401, AI983536, AW250705, AA657972, W28944, AA767300, AA706825, AI587185, AI189408, AW248699, AW073190, AI347314, AI524186, AA563745, AA495799, AI168297, AI310528, AW130176, AA838407, AI955019, AI346558, AI356497, AI028668, AA917828, AW246849, AI140292, AI084924, AA232967, AI148985, AI678784, AI281328, AA948694, AI082557, AI150722, AI276605, AI014882, AI803268, AW169494, AI333698, AI333302, AA253369, AI740611, AI831634, AA670367, AI082804, AI080366, AA777091, AI816955, AI753298, AW028800, AI679052, AA764739, AI215157, AI393800, AA148919, AW404750, W49510, AI087262, AI197944, AI089710, T70527, AA253492, N54782, AI344641, AI460108, AI933303, AA315786, W79013, AI539484, T79608, AA076080, AI971904, AA300208, AI290314, AA677875, AI347377, AI183485, AA743340, AA775359, D63259, AA989095, AA507572, AA705697, W16716, R83908, AI362504, AA749447, AA708333, AI857590, W46838, AW069333, AA495736, AA410264, H57844, AA625770, N79535, AI262439, T68602, N90776, AA865920, W19200, AA306173, AA865906, AA099528, AW192370, W80405, AA234363, AA128388, AW249131, T30208, R83907, AA194982, N75707, AA362705, AI221840, AA458624, AI921358, AA194997, AA808409, AA588355, AA887944, AI264098, AA234413, C17057, W49511, N90242, AI245717, T16103, AI127393, AA255797, AA933878, AA557707, AA641364, AA256690, H63263, T34009, H38215, AA480658, AI041628, AA148891, AI587030, AA199839, T78631, T81385, AI368525, AA358466, N49510, AA336108, AA377553, AA309101, T72836, AI468707, AW131524, AI264469, AI283776, AI269350, H44001, AI080399, T81384, T68683, AI990425, T72355, N75325, AA199911, AA233135, AA846765,

					AI352057, AI954908, AI422513, AI434527, AA887052, AA406584, AA359371, F37868, W04776, AI311094, H37992, T79693, R82477, AI473295, AA552356, H59969, AI864371, AA479548, AA099527, AI695607, AA455531, AI924257, AA767829, T73246, F28542, AA428810, D25570, AA091800, AA805180, AA429337, R36837, AI241215, T41059, C20939, AA346761, AA173883, AA248560, AA808574, AA605086, AL036736, AF134895, AF146018, AF113251, and AF146689.
HSLEQ79	12	1184946	1 - 660	15 - 674	AA199788.
HUCME08	13	1082023	1 - 612	15 - 626	AW250705, W16716, W28944, AW404750, AA315786, AI460108, D63259, AA255797, AW249131, C17057, AI041628, AA148891, AA377553, T81384, T72836, T68683, T72355, AA309101, AA358466, AA359371, W04776, AI760724, W79013, AA199911, AA410264, AI311094, N49510, R36837, AI310528, N75707, AA605086, AI086374, AA495736, AF134895, AF146018, AF113251, and AF146689.
HNGOW33	14	1152254	1 - 1146	15 - 1160	AI526183, A38246, AR029496, A11542, AR029497, and A11524.
HT4GD03	15	1103896	1 - 1185	15 - 1199	AI468008, AI492094, AI970413, AI521923, AI028459, AI040406, AI333579, AA703357, AA252428, AI972753, AI964003, AI656960, AA877725, AI804669, AI682438, AI669759, AI624888, AW196667, AI638764, AI076149, AI832204, AI610987, AA625737, N90234, AI763375, AI535962, AW014594, AA670436, AI424567, AA576561, H61341, W39156, AW134874, AA541628, AI924201, AI198343, N93695, AI911538, AA766826, W21033, AI814342, AI991685, AA888820, AI366738, AW001123, C14331, C14429, D59859, AW177440, T03269, C14389, AW179328, D80188, AW178893, D51799, D58283, D80022, D80166, D80195, D80193, D59927, D59467, D51423, D59619, D80210, D80391, D80164, D59275, AW178762, D80240, D80253, D80043, D59787, D80227, D59502, AW378532, D81030, AW352117, D80212, D80196, D80219, C15076, D80269, D57483, D59610, D80038, D80366, AA305409, D51022, D50979, D50995, D59889, D80024, AW177501, AW177511, AW360811, D80378, AW176467, AW375405, C14014, AW178775, D80241, AA305578, AI557751, D80045, D51060, AI905856, AW377671, AW179332, AW352158, AW366296, AW360844,

					AW360817, C75259, D80248, D81026, AW375406, AW378534, AW377672, AW179023, AW178905, AA514188, AW378540, AW352171, D80522, AW377676, AW352170, D80251, AW177731, AW179329, AW178907, AW378528, AW179019, AW179024, AW360834, AA514186, D80133, AW178906, AW177505, AW179020, D80134, AW178909, AW177456, AW178980, AW177733, AW178908, AW178754, AW179018, D58253, D51097, AW179004, C05695, D80439, D80268, AA809122, AW178914, AW178774, D80247, AW378543, AW378525, AW178911, T48593, F13647, D80302, D80132, AW178781, AW352163, D51103, AA285331, C14227, AW178983, AI935359, D80064, D80157, AW367950, C06015, AW177723, AW178986, AW367967, D80314, T11417, AI535959, AW352174, AW378533, D45260, AI535686, D58246, D59503, C03092, H67854, AF077740, Z97630, AF093403, A84916, A62298, Y17188, AR018138, A62300, X82626, Y11505, D88547, A78862, X67155, A67220, D89785, A30438, D34614, D26022, AJ132110, A25909, X68127, AF058696, U79457, AR008278, AR025207, Y12724, A82595, AB028859, AR008443, Y17187, A94995, AB012117, I50126, I50132, I50128, I50133, AR066488, AR060385, AR016514, AR060138, D50010, A45456, A26615, AR052274, A85396, AR066482, Y09669, A44171, AB002449, AR066487, A85477, I19525, A43192, A43190, AR038669, A86792, AF135125, X93549, D88507, U46128, AR016691, AR016690, I18367, A63261, D13509, AR060133, AR066490, A70867, AR008408, AR062872, A64136, A68321, I14842, AF123263, AR054175, AR008382, and AW772362.
HAQBZ89	16	949061	1 - 311	15 - 325	AL042537, and W16450.
HCCCC81	17	949062	1 - 1297	15 - 1311	AI436552, AW071796, AI299053, AI334145, AI161282, AI613263, AI018067, AI921361, AI934889, AI984679, W52097, AI281829, AA236375, AA121294, AI342850, W16450, AA729045, AA608803, N78654, AW135827, AW193167, AI689644, N46334, AI159772, AA456075, AA130122, N63941, N58535, AA367722, AL042537, AA969946, AI432541, AA781924, AA829498, AW304842, AI299054, T69736, AW194058, AW170746, AI382899, AA862441, AA257021, AA345125, AI049756, AI983846,

					AI129698, T70395, AA130159, AA455578, AA833560, AW351523, AL119457, AW392670, Z99396, AL119324, U46351, AL119391, AL119319, U46347, AL119497, U46350, AL119484, U46341, AW372827, AW384394, AA451639, AW363220, AL119355, AL119363, U46349, AL037205, AL119443, AL119401, AL119522, AL119439, AL119444, AL119483, AL119341, U46346, AL134531, AL119418, AL134525, AL134536, AL119396, AL119335, AL042544, AL134902, AL134533, AL134528, AL119399, AL043019, AL119496, AI142132, AL134538, U46345, AL043033, AL042450, AL042542, AL042614, AL043003, AI205015, AL042984, AL039851, AL042965, AL042975, AL043029, AL042551, AL119464, AB026436, AR066494, AR054110, AR060234, A81671, and AR069079.
HE8PW83	18	927532	1 - 968	15 - 982	AA203427, AI650913, AI651056, AA707184, AI283739, AW135507, R10286, AA010205, AW296131, AA333931, W01187, AF121182, AB002584, and D38100.
HE9QQ22	19	949080	1 - 1062	15 - 1076	AA010242, R83190, N94219, N90644, T72234, N90655, T74930, N90629, N65959, R83191, D38100, and AB002584.
HFPFB39	20	946170	1 - 1601	15 - 1615	AI631883, AI767614, AA018867, R56792, AI497937, N95592, R44001, AW271411, R56793, Z38315, and Z42023.
HSDJI44	21	1151680	1 - 2531	15 - 2545	T11417, C14227, D81111, D58246, D80258, D80014, D59503, D80064, AA514184, AI535959, AI535686, AI557751, A38246, A11524, AR029497, E05333, E00893, and AR008408.
HE9DG38	22	1181748	1 - 1442	15 - 1456	AA911739, AI424010, AW082869, AI422406, R37777, H30676, R13816, F06133, Z39043, R37676, R13678, N55218, AA312035, N56305, R13983, AI792322, AI791644, and H28118.
HGBAT24	23	1024746	1 - 406	15 - 420	D57159.
HTDAF92	24	1181747	1 - 1147	15 - 1161	AA312035, AA911739, AI791644, AI792322, R13983, AI424010, AW082869, N56305, AI422406, H30676, F06133, R13816, R37777, R13678, and AI732836.
HAPSI19	25	668405	1 - 385	15 - 399	AI887474, AI065167, AI114842, AI951080, AI065047, AL048067, AL048071, AI458797, AI492547, AW192781, AI207495, C18171, AI829470, AI557340, AI583399, AI132960, AI132922, AA535634, AI749057, AI354562, AA575933, AI683809, AI587659, AI434930, AW304881, AI535650, AL035892, AW386749, AI207417, AA229325, AA640644,

				AI207635, AI366457, AI267618, AI253312, AI216975, AI061621, AW129679, AI557304, AI253355, AL047732, AW277017, AA877951, AI207605, AA907466, AA249196, AW152189, C18021, AW270589, AI032013, AI525006, AI064822, AA989707, AA659429, AI535927, AL035872, AA984251, AA211543, AI860329, AA640707, AA613407, AI986242, AA890612, AI246519, AW238199, AI525147, AI619468, AA577946, C18493, AI857866, AA096060, AA497076, AI744914, AI832323, AA226475, AA507318, AI537521, AA618220, AI547044, AA069628, AA650397, AI524901, AA194357, AA091279, AI873555, AI207704, AI830939, AA642880, AI444931, AI525077, AW055313, AI889303, AI613501, AL038700, AI635034, AA564933, AF114131, AI538877, AF114137, AI982985, AI499124, AA714588, AI473635, AI525125, AA093728, AW189279, AI625450, AW190310, AI064873, AW080936, AI253313, AL048424, AI444926, AA773464, AA093719, AI446678, AI923690, AA908867, AI557466, AA093577, AI872438, AI674287, AI828261, AA069350, AA575854, AW368670, AI476000, AI521680, AA215877, AI457454, AI924119, AA247775, AI872322, AA467795, AA742720, AA090236, AA468473, AA223645, AI689587, AW270766, AA654819, AA525471, AA878421, AA216330, AI633327, AI110748, AA714156, AI890503, AI890611, AA094521, AI923940, AI445741, AI986095, AI114837, AI114552, AI445647, AI635188, AI569437, AI610529, AI872097, AI571919, AA247792, AW131332, AI434972, AA641169, AA626558, AI827447, AA155969, AA232446, AI954505, AA548805, AA661698, AW070760, AW157238, AI492544, AI561046, AI925265, AI557015, AI491934, AA211022, AI908728, AI926739, AI627733, AA225388, AW167378, AW236356, AI587287, AI133265, AI708169, AA247479, W47670, W94397, AA487110, AA503983, AA714266, R28899, AW129752, AI799251, AI682933, R28753, AA507697, AI559959, AA095593, AI114444, AI829437, AI805758, AW166229, AI207623, AI434085,
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HADTU18	26	666268	1 - 450	15 - 464	AA115399, AA180941, AI525779, AL048467, Z98468, AA180879, AL037961, AI132950, C18849, AI540982, AA503155, AA467916, AW270568, AA147875, AA523369, AA147138, C17914, AA248428, AA828615, AA610797, C17592, AA533146, AA468916, C17634, AA641056, AA182403, AA469384, AA131426, AA177092, AI535678, AL038782, AA548209, AI832713, AA181413, AI133326, C17520, AA533654, AA467874, AA468090, AA134092, AA469455, AA083296, AA214681, AI525553, AA194499, AA879244, AA178872, AA424930, AA192816, AA524630, C16951, AA650350, AA206277, AI525589, AA652263, AA229365, AA157661, AL048223, AA195788, AI557341, AA186485, AA579252, AI880907, AA229353, AI749086, AA180994, AA194687, AA112861, AI525178, AI557313, AA187125, AA194273, AI720611, AA522594, C17424, AI720582, AA132126, AA194546, AA737156, AA186996, AA178896, AA192817, AA130611, AI888059, AA469166, AA194505, AA182903, AA579030, AA091934, AA193156, AA523654, AI459469, AA165490, AA569535, AA180137, AA501707, AA176516, AA192574, AI557370, AA192670, AA579390, AI749735, AI557102, AA180873, AA879300, AA130827, AA478982, AA213947, AA745378, AA079046, AI601133, AI749789, AI557381, AA640278, AA531446, AA136007, AA179137, AI557088, C17077, AA213905, AA501537, AI564503, AI795888, AA188331, AI525571, AA197055, AI401656, AA156168, AI079227, AI888702, AL047719, AI039890, AA178848, AA143576, AA630148, AI721182, AA640922, AL035955, AI557043, AA182943,

					AI253349, AA449182, AA091771, AW058230, AA578171, AW149803, AA248319, AA196841, AA643083, AA197221, AI832827, AA176518, AA575856, AI336230, AA226358, AA809540, AI679256, AA541754, AA093033, AI525569, AI859687, AI253353, AA079522, AA910188, AA477388, AI833274, AA130338, AI880643, AI683500, AI749577, AA664911, AI860015, AI565146, AA133044, AA194500, AA194379, AI742323, AI720486, AA091233, AI567683, AI064923, AI570248, AI799675, AI557278, AI859381, AI819457, AA483433, AI475978, AA085471, AI526043, AI207550, AA216072, AI654020, AA991485, AA096056, AA091609, AA738023, AI539651, AA487821, AI833271, AA095954, AI749856, AW152109, AA188266, AA069895, AI961292, AI880419, AI805532, AI683406, AI525664, AA226562, AI022093, AA247193, W03222, W03206, AA074257, AA642159, AA588085, AA659528, AI984574, AI635597, AA147081, AI679202, AI949078, AI653843, AI735219, AI971524, AI720480, AA181431, AI749870, AA804880, AI174867, AA594741, AI525610, AA578175, AI636313, AI859301, AA554723, AA771997, AI628841, AI801302, AA642606, AA074320, I27366, X15759, U12691, U12694, U12690, U12693, M25171, X62996, D38112, V00662, J01415, X93334, AF035429, AF134583, U12702, U12695, U12696, U12706, M58009, U12697, U12705, D38116, D38113, X93335, Z59071, AB019563, Z57801, Z63194, Z59274, Z55198, AF004339, Z58044, U12703, X55654, X97712, D38115, J02825, U12704, Z54385, Z59073, X97707, Z56866, Z56698, Z58022, Z61931, Z57991, Z54739, Z55821, Z61907, Z56370, Z59273, Z64469, Z54740, AC067849, and AC067849.
HNTEF53	27	954852	1 - 2342	15 - 2356	AA557324, AI655577, AI696732, AI923200, AA863360, AW262723, AI697332, AW275990, AI436648, AW276183, R56515, AI362521, R53456, R53457, D62878, AA337301, AA652746, AW264444, R56123, AA319338, D79346, D79250, N56346, AA886832, and AL138223.
HWLLB11	28	954849	1 - 731	15 - 745	AI745636, and AA102414.
HCRQK86	29	1193068	1 - 1477	15 - 1491	AI738595, AI968102, AA992363,

					AA595667, AI221343, AA551102, AI473733, AI953574, AA600319, AI138415, AI983106, AI088415, AI275031, AI969275, AI963252, AI365652, AI952001, AA121435, AA121689, AA888885, AW073176, AI953081, N64815, N64775, H52938, AI217079, H91146, AA328950, AA028190, AA034514, AA767177, AI143327, AA237008, AA719852, C15450, C15167, AW016668, AA333581, AW205484, AI865594, Z41850, T83574, AI653109, AI469699, F11116, F02863, AI205214, AI933247, AI865456, AI926433, AI586929, AA255832, AW197365, AF095927, and AF117831.
HOCOT88	30	933635	1 - 2215	15 - 2229	AA210814, H09300, AA532934, AA223910, AA084506, Z45274, AA356245, T07284, AA287364, AA702550, R58777, AA096276, H05251, AI708852, AA224030, AA506405, AA210694, AA550736, AA017240, AW293194, AW293197, AA580047, AA287502, AA493521, AA081618, F04960, AA017331, and AI925978.
HELEF11	31	926930	1 - 767	15 - 781	
HOUGD29	32	1204714	1 - 2274	15 - 2288	AW243053, AI674036, AI160750, AA426073, AI299702, AI079952, AA405859, AI805286, AI828341, AW022161, W24408, AI421345, AW206919, AA351454, AW118669, AI263265, AA640181, AW134737, R13311, AW135904, AW008702, AA041245, R40791, T16675, AI418741, AI572229, AA040806, AI057025, N93105, AA954204, AF117948, and AL050031.
HSIGN57	33	910078	1 - 748	15 - 762	AW408450, and AB029015.
HTEPE35	34	948475	1 - 825	15 - 839	AI935040, AA861064, AA933697, AA707583, AA872105, AA398866, AA609626, AA620685, AA435866, AA812556, AA781805, AA993718, AF012362, AI217888, and AA824315.
HUFDB74	35	1227205	1 - 1146	15 - 1160	C05134, AA190389, F13061, AW411339, T75371, AA296815, AA024667, R80747, R25948, AI978930, AW090612, and AC002117.
HBXAB33	36	1229908	1 - 567	15 - 581	I62365, A43194, U13660, AR037041, A79614, A79616, E13190, T49201, T49202, T53481, T53482, T68549, T68624, T74983, R10314, R10315, R06060, R43579, R56437, R56438, R60210, R60444, H09968, H09969, H15371, H15372, H22521, H22522, H29878, H29975, R89835, R89874, H53152, H58314, H58893, H58894, H60856, H60944, H65740, H65741, H70538, H71233, H71234, H77847, H77898, H78398, H80613, H80647, H86014,

					H95592, N20243, N29307, N32276, N35104, N36175, N37018, N43848, N44564, N45081, N45535, N46462, N48684, N49919, N52308, N53702, N63679, N64012, N72963, N73066, N76022, N80561, N92118, W04373, W07684, W17059, W68724, W68746, W73413, W73736, W78144, W79494, W96088, W96089, N89646, AA034455, AA047643, AA047758, AA053966, AA071345, AA074120, AA074663, AA082148, AA082724, AA102435, AA100628, AA133663, AA133664, AA135415, AA135250, AA151203, AA151204, AA180014, AA180800, AA181765, AA182498, AA188047, AA187028, AA189155, AA190454, AA191397, AA193677, AA196557, AA196660, AA213451, AA223741, AA223771, AA227147, AA227034, AA227316, AA232567, AA243096, AA252693, AA255843, AA262239, AA280350, AA280432, AA282094, AA534122, AA541793, H58705, H78496, H85879, AA618430, AA576191, AA738438, AA743265, AA766553, AA769093, AA825769, AA885930, AA923535, AA948692, AA985655, AI096615, AI096843, N85630, W22597, W22736, W27861, C04101, AA641672, AA206459, AA205708, AA205656, F21465, F21791, AA416607, AA416554, AA443668, AA447054, AA487196, AA487521, AA665548, AA629673, AA405346, AA815382, AA854606, AA985064, AI061068, AI091598, AI091588, F00745, F01051, F12892, F10498, AA772925, AA694465, AI244983, AI262520, AI279213, AI284132, AI288283, AI302113, AI310752, AI348974, AI348985, AI357714, AI362576, AI372092, AI299530, AI424550, AI439591, AI422046, AI583446, AI423334, AI143251, AI149205, AI624090, AI184522, AI536853, AI539732, AI610912, AI819904, AI820004, AI831271, AI831559, AI869117, AI919343, AI919383, AI937256, AW080792, AW051772, AW084303, AW117977, AW152091, AW244101, AW268260, AW273069, AW189310, AW190358, AW192444, AW514839, and AW612948.
HMABF84	37	1198479	1 - 1856	15 - 1870	AI676022, AI802784, AW451890, AA029526, AI521974, AI927328, T89625, AA968591, AW294436, AA337383, AA917819, AA256057, AA286896, AC002554, and U73628.

HPTVF17	38	1150836	1 - 1027	15 - 1041	AA224259, T87253, AA968591, U73628, and AC002554.
HSDIC55	39	1197407	1 - 758	15 - 772	I08484, I08485, I08487, and E16758.
HSDIL35	40	1228138	1 - 300	15 - 314	R45895, R28735, R29445, AA585325, AA585098, R29657, T18597, R28892, AA170832, R29218, AA585476, AA585101, D57491, AA283326, D60844, D61185, R28895, R28967, AA585439, C16315, Z32822, D60765, AI557734, D61254, Z28355, AI557262, D53161, AI546875, D59436, D53472, AI557864, AI541356, AI557740, R28965, D59751, AI547250, C15406, D54897, AI546945, AI526140, AI546971, AI541365, AI525500, AI525306, AA585155, AI546999, AI541383, AI541374, AI557763, C16293, C16294, Z32887, D52835, D55233, C15069, AI541205, C16300, AI525431, D53447, C15120, AI526078, AI557727, AI557731, C16292, C15762, AI526184, AI541535, AI547039, Z30131, AI525556, C16305, AI541517, AI541013, AI526194, C15737, AI546996, AI557787, AI546921, AI541307, AI540967, AI525316, AI557807, AI546891, R29179, AI541523, AI547006, R29177, AA585356, AI541346, C16296, AI547202, AI557084, AI526016, AI557408, AI525339, D57186, AI525320, R29262, R29172, AI547196, AI557758, AI541034, D60730, AI526191, AI541527, AI557718, AI557155, AI557602, AI557809, C14208, AI540974, C16290, AA585453, AI526109, AI556967, T19407, AI526113, AI557808, AI541321, AI526073, AI540903, AI526180, AI546829, AI541510, T41289, AI535639, Z33559, AI557279, AI557264, AA174170, AI526195, AI547137, AA585430, AI536138, AI526024, AI526112, AI557039, AI526158, AI535660, D54850, AA514191, AI524890, T41329, AA585117, D51433, AI557799, AI525856, AI557533, AI541422, AI525286, AI541345, AI525332, D59458, C14322, AI540920, AI546828, AI541506, AI546831, AI525656, AI524904, AI547189, C14391, C14723, AI541415, AI541514, AI546954, AI526117, AI526187, AA585434, AI557852, AI541017, AI541027, AI546901, AI557238, AA585440, AI540882, AI541390, AI541515, AI524891, AI557796, AI541508, AI541492, AI557082, AI557285, AI557041, AI526205, AI547026, AI557786, AI540944, D61060, AI557317, AI525114, AI525168, AI547071, AI557810, C14210, AI525076, AI541423,

					AI541075, AI557802, T10982, AI541410, AA585420, AI557785, AI525653, AI547158, I08485, E16758, I08484, I08487, AR062871, A25909, AR038855, Y09813, Z32836, AR054723, AJ244005, Y16359, AF082186, X81969, D50010, D13509, AJ244004, A20702, AR062872, AR062873, A20700, D78345, A43189, A43188, AR038762, AR017907, AJ244003, X82786, AC005913, X76012, X55486, A98420, A98423, A98432, A98436, A98417, A98427, A98767, A93963, A93964, I63120, AJ244006, AJ243486, AR003381, AR031358, AR031365, AR017826, X82834, and Z30183.
HTXSM05	41	1104951	1 - 552	15 - 566	N48523, AA307559, F00168, AA130794, AA215731, AA190411, and AI904194.
HYAAH23	42	1032585	1 - 840	15 - 854	AI086374, AI985881, AW025363, AI744911, AI417334, AI608898, AI760724, AI185630, AI086397, AI419401, AI983536, AA767300, AA657972, AI587185, AA706825, AI189408, AW248699, AI310528, AW073190, AI347314, AI524186, AA563745, AA838407, AI356497, AA495799, AI168297, AA917828, AW130176, AI955019, AI346558, AA232967, AI028668, AW246849, AW169494, T70527, AI140292, AI148985, AI084924, AI333302, AI281328, AA948694, AI678784, AA764739, AI082557, AI276605, AI014882, AI150722, AA253369, AI803268, AI333698, AI831634, AI740611, AI753298, AI082804, AW028800, AA670367, N54782, AI080366, AA777091, AI215157, W49510, AI089710, AI816955, AA148919, AI679052, AA253492, AI087262, T79608, AI197944, AI393800, AI344641, AI933303, AI539484, AA076080, AI290314, AI347377, AI971904, AI183485, AA300208, AI857590, AA677875, AA743340, T68602, AA708333, AA507572, AA749447, AA775359, AA989095, AA705697, AI362504, R83908, W79013, AW069333, W46838, W19200, H57844, N79535, AA495736, AA625770, N90776, AI262439, AA099528, AA865920, AA306173, AA410264, AA865906, W80405, AA234363, AW192370, AA128388, T30208, R83907, AA362705, N75707, AA194982, AA458624, AI221840, AI921358, AA194997, AA887944, AA588355, AA808409, AI264098, AA234413, W49511, N90242, AI127393, AI245717, T16103, AA933878, H63263, AA557707, AA641364, H38215,

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HTPDX13	43	1134372	1 - 908	15 - 922	AF017639.
HAHHE43	44	1172244	1 - 2529	15 - 2543	AA442414, AL037261, AW070401, AI457525, AI016211, AI433014, AI240432, C21505, AW382682, AA587446, AA848047, AW074687, N38806, AI285709, AA024410, AI809829, AA551399, AA226173, AC006441, AL117258, AC005015, U91323, L78833, Z98200, AC004531, AC007225, AC002302, AC002420, AC005911, AP000557, AL031685, AC007637, AC005088, AC004883, AC005666, AC007277, AC005488, AL049761, AF001549, AC005089, AC004966, AC005037, AL023807, AF134726, AL031311, AC006064, AL133163, AF111168, AC007676, AL096791, AL008718, Z85987, AC004893, AL050307, Z93017, AD000092, AC004106, AC002563, AC005531, AL109758, AC002425, U91321, AL009172, AC006014, AF196779, Z93241, AC005500, AP000553, AL080243, AC005011, AC004216, U96629, AP000501, AC005086, AL031670, AC005328, AL139054, AC006270, AC005081, AL022237, AC002365, AC004491, AC003982, AL031276, AL031680, AC004033, AC006026, AC005620, AL034549, Z85986, U15422, AC005803, AC005071, AC003663, AC005207, AC004834, AL035461, AF030453, AC005180, AC004813, AF047825, AC007773, AL109984, AL021154, Z84466, AC005102, AC005722, AF109907, AC002115, AC004841, Z99127, AC005736, AC003070, AF030876,

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HAAV28	45	948630	1 - 502	15 - 516	AA305351, N25416, T32745, AA732278, R96887, H12989, R24370, T35889, T34115, F11505, T35841, T30076, T35834, Z42248, T36163, W19619, N42630, T35833, T35871, AA034976, F05477, AA866178, AA322616, AA355325, AA812101, AF190797, and AL121579.
HAPOR59	46	712955	1 - 430	15 - 444	AW407636, AA805331, AA609056, and AC007444.
HBIBF78	47	1123470	1 - 1410	15 - 1424	R67200, T18597, AI525556, AI535660, AI541205, AI525500, AI557533, AI557082, AI541075, AI557258, AI541321, AI541034, AI525856, AR050070, A62298, A82595, and A82593.
HCDAJ15	48	1091635	1 - 622	15 - 636	AA845289, AI587025, AI696467, AL109847, AC004486, U95743, AL023875, AP000966, Z98304, AL031056, AC004087, AP000039, AP000107, AL031407, and AP000280.
HCE1S21	49	671209	1 - 285	15 - 299	AA663839, T64371, AC007666, AC000052, AC004019, AC000052, AC000052, AC004019, AC004019, AC004019, AC007666, AC007666, and AC007666.
HCE3J64	50	951228	1 - 676	15 - 690	AA448371, AA448777, AW341249, AB011176, U27341, and AC061705.
HCFCV92	51	1124565	1 - 1130	15 - 1144	AI623716, AI458826, AI280154, AA831121, AI557306, AA687968, AA768629, AI623717, AI500033, and N42105.
HCFLI54	52	921382	1 - 631	15 - 645	AA835065, AI634477, H04996, AI092992, R12577, R12489, T98498, AI807696, AI701147, AI336678, Z39187, R42405, R38979, R42406, AI376737, AA243599, F10155, AA554471, AA758778, AA417699, AI445600, AI004105, AA211467, AA211477, AI363083, AW150977, AA953676, F02234, AA356905, AA193346, AA193464, AI420621, AA910341, AI696583, AA836213, AC005562, AL035658, Z54386, AC023278, AC023278, AC023278, AC005562, and AC005562.

HCFND04	53	1155680	1 - 1817	15 - 1831	AI091533, AI276640, AI802181, AA385823, AL119399, AL079794, AL042382, AL119457, AL042544, AI613038, AI802542, AI924686, AW103628, AW071417, AL042628, AL040243, AI537677, AA225339, AW088899, AI932794, AI567582, AI610362, AI570807, F27788, AI288285, AW149925, AI824576, AW160916, AI923989, AI499285, AI680498, AI917252, AL121286, AL119511, AI812015, AI345416, AI345612, AI890907, AI932638, AI221035, AI678357, AI345415, AW150457, AI270183, AW268122, AI866770, AI440239, AI929108, AI890223, AI637748, AW129230, AI431909, AI952862, AI358701, AI491852, AI564259, AW079572, AL046942, AI334445, AW020561, AI963846, AI934011, AL042745, AI335426, AI348777, AL041150, AW263823, AI636588, AI874166, AI280732, AI627988, AI184903, AA833760, AI811912, AI554821, AI612913, AW168485, AI560184, AI956080, AW073697, AI623682, AW268302, AI620089, AW072719, AI281867, AL048871, AL038445, AI500588, AW020164, AI802240, AI500061, AI670009, AI927755, AW087938, AI633125, AI207572, AI284484, AW083750, AL039086, AI475371, AI473799, AI254731, AI624084, AL079963, AI969655, AI241923, AI468872, AW084219, AW151847, AI798456, AI473536, AL048323, AI698391, AL037582, AL037602, AL039276, AL048340, AI274745, AA427700, AI591407, AI950892, AL045266, AI673363, AI537261, AI916419, AI554344, AI537617, AL036638, AI862135, AL110306, AI349967, AI758437, AL043326, AI648502, AI280661, AL036541, AW302954, AL036548, AW079336, AI826225, AI638798, AI811785, AW151136, Z99428, AI865906, AW105431, AW162189, AI345477, C16221, AI879064, AW262565, AA806720, AI689420, AI491775, AI440263, AL079740, AI580436, AI612759, AW161156, AW083573, AI571439, R81679, AW162194, AW079075, AW089310, AI497733, AW079409, AI922315, AI307557, AI635016, AI611738, AI619502, AI677796, AI306613, AI886181,
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HCHMV63	54	1190101	1 - 1439	15 - 1453	AA528091, AI937130, AL043928, AA512928, AI003767, AI950845, AI681293, AW020408, AI126197, AW189101, AA421192, N56993, AI081289, AI498013, AA278851, W76552, AA285337, AI568488, W74357, AA609588, AI634849, AA417379, AI272841, AI082525, H72715, AA862669, AA370112, F37679, R48578, AA508735, R18652, AA993015, R09304, T73701, AI383524, AW193459, AW027819, AA508168, AA298483, AA428290, AI608919, AI916400, AA360685, AI001776, AW189612, R09199, AI371477, R48679, H97957, AA706851, AA766418, AI222565, AA565335, AA548319, AA428723, N73552, T73726, R73134, R73194, AA298688, AI349777, AI266766, AI251698, AL119324, AL119457, AW274324, Z99396, AI254621, AL042544, AL119399, AW392670, AL134524, AL119484, AL036418, AL038837, AL037051, AL036725, AW268781,

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HCWDL45	55	889416	1 - 397	15 - 411	Z98747, AC023100, and Z98747.
HCWEI19	56	1125258	1 - 434	15 - 448	AI657485, C14723, C14322, C14391, N83963, AA092643, N86592, AI547071, AI541508, D81306, R29179, N83707, C14208, D53472, C16305, AI526073, D51446, T41289, AI547202, AI557734, AI541523, AI526184, AI540920, AI526117, AI541390, AI526180, AI541415, AI556967, AA585453, AI557072, AI541017, AI525076, AJ243486, AR018815, AF045432, U39066, U48697, U48696, X99056, X99052, Y16299, X99058, X99051, AF102850, AF001863, AF061744, X99055, X81969, AF011573, AR062872, AR062873, A98420, A98423, A98432, A98436, A98417, and A98427.
HCWKB72	57	1224131	1 - 3194	15 - 3208	AA310583, AI075167, AA828260, AA315219, AA309994, AI141283, AA020899, AA725020, AW367821, AI052660, AW445176, AA188038, AA311591, AA378802, AA191133, N22658, AA193339, AA359023, AA333402, AL044687, AI343256, AI805548, AI805364, AI632447, R99546, AW205256, AA355616, AI140558, AA506758, AW235758, R97777,

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HDDAF49	58	1125713	1 - 906	15 - 920	AL133047.
HDPGQ74	59	691163	1 - 308	15 - 322	AA077608, and AC073462.
HDPGS68	60	752975	1 - 448	15 - 462	AC034180.
HDPIX67	61	1172240	1 - 2934	15 - 2948	AF147773, AF152898, AI708697, N51342, AA825888, AI292226, AI288960, N39421, AA975060, AI261689, AW291891, N48537, AI695627, AA406030, AI699867, AA406029, H26638, AL046205, AA669840, AL046409, AI284640, AW274346, AA508359, AW069510, AW303196, AI963720, AI431303, AW301350, AA490183, AI270117, AW079792, AI583283, AW193265, AW274349, AI799642, AA468244, AI370878, AI654525, AA584195, AA806796, AA846876, AL138455, AI434695, AA587604, AI972203, AW338086, AA613203, AL134972, AI537955, AA491814, AW438643, AW276827, AW265385, AA580808, AA577906, AI350211, AA503600, AI821271, AA584167, AL037683, AA623002, AI370074, AA618452, AW273218, AI375710, AA503473, AI382614, AI613280, AI754955, AI801591, AI499938, AW021583, AA467820, AA977743, F17891, AI471481, AI053672, AA713891, AI061143, AW073470, AA664581, AI732120, AI688846, AI610159, AL121235, AA720702, AW022379, AA453558, AI744995, AA653618, AW072587, AI281881, AA613227, AI919029, AI312309, AA569387, AA551503, AW440497, AW075511, AA599920, AW193432, AA847952, AA502155, AI860013, AI708125, AA488746, AA613232, AA594145, AI564185, AL119984, AA679672, AW162049, AI370094, AI633025, AI929531, AA908468, AI339850, AI434311, AW103758, AW050498, AI687260, AL040921, AA664015, AW327868, AI368745, AI457397, AI754658, AA521323, AI379719, AA507824, AI423625, AI341664, AA351056, AI281468, AL119691, AI345654, AI192631, AI366464, H51714, AA525824, AA713815, W79504, AA468131, AI061334, AI085719, AA601499, AA367986, AI619997, AA177061, AW079135, AA478355, AI133164, AL042753, AA335134, AI962050, AA984708, AI301700, AL044940,

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HDPXN01	62	1125610	1 - 495	15 - 509	AI651231, AW196757, AA101088, AI627422, W94251, W94274, AA912880, AI093809, AI867562, H06521, H20526, AW151979, AI590043, AI554821, AW151136, AI539771, AI537677, AI494201, AI500659, AI828574, AI866465, AI815232, AI801325, AI500523, AI538850, AI887775, AI582932, AI872423, AI284517, AI923989, AI500706, AI491776, AI445237, AW151138, AI521560, AI889189, AI500662, AI539800, AW172723, AI284509, AI538885, AI889168, AI440263, AI866573, AI633493, AI434256, AI866469, AI434242, AI805769, AI888661, AI500714, AI284513, AI888118, AI859991, AI436429, AI648567, AI355779, AI889147, AI581033,

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HDQFT77	63	1136137	1 - 1414	15 - 1428	AI582617, AW194919, AI393304, AI760916, AI378837, AI628122, AI525818, AA861720, AI682246, AA775482, AI651311, AA025281, AI857832, AI340350, AI348117, AI338259, AI015680, AI242142, AI860137, AA476668, AI200562,

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HE2FR50	64	508498	1 - 379	15 - 393	AA329700, AI808413, AI961240, AI718802, AA827821, AI572903, AI379116, AW262991, AA446001, AA150385, AI141317, AF129534, and AC010408.
HE2SN25	65	1151226	1 - 1306	15 - 1320	AW327262, AW327616, AI016714, AI769182, AA725234, AI051725, N62194, AA483400, AA483411, AI554330, AA847865, M85521, N66755, AA933624, AI825794, AA902896, R60056, AA594900, H05474, T16298, AA977118, AI671131, AA054722, AA650410, R43427, AA761969, AA716570, AA916000, T34734, AA054669, T90105, AA805766, AA342241, AA811545, and T82929.
HE8AE26	66	1147168	1 - 1108	15 - 1122	AA331521, AA331463, AC005071, AF030453, AC002551, AC004084, AC004878, AC006480, AC006014, AC005088, AC004447, and AC005488.
HEBGK01	67	963673	1 - 730	15 - 744	AI937365, AI392899, AI738487, AI762089, AW005988, AI273612, AI199565, AA310331, AI674232, AI423302, AI373573, AI498277, AI805937, AI479717, AI423099, AI479444, AW172357, AA843385, AI263152, AI015112, AW001280, AA232568, AI015123, AI492142, AI969880, AA158791, AI865576, AI363811, AI937401, C21054, R68197, AA335730, AI758134, AI825116, AI928600, M91490, AA045131,

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HEFMB30	68	691516	1 - 403	15 - 417	AI813271, AI459195, AI796347, T71268, AA702812, AC012481, AC012481, AC016659, and AC016659.
HEOPE58	69	851009	1 - 463	15 - 477	AL078634, AP000117, AP000194, AP000313, AP000050, AL078634, AL078634, and AL078634.
HETBR74	70	948667	1 - 863	15 - 877	AI424957, AA865175, AI345105, AW337653, AI493383, AA992117, W86236, AW001913, T23935, AI141791, AI277560, T33653, T91218, AA469060, AA148613, AI635951, AI500569, T72018, AI290957, AA159337, T32385, AI088662, AI140973, AA534837, F10818, AI703234, AA486780, AI935264, AA999981, T94771, H50506, AA774208, T98781, H51340, H43580, N57875, AI696236, H44933, N64109, N40952, and AL137633.
HFCAG94	71	1111177	1 - 997	15 - 1011	AA338681, AI457313, AI634187, AW069227, AI978782, AL079734, AA021561, AW117704, AW083102, AW117723, AI432298, AI431513, AI889579, AA176605, AI004591, AI653776, AA629412, F24745, AA219349, AA056250, H29914, AI469599, AW082104, AI912401, AI206841, AI962030, F35684, AA583386, AA130647, AI189682, AW002831, AW272774, AI355246, AW302017, AW130591, AI280266, AI491765, H53284, AA773463, R93919, T47138, AI583291, AI434037, AA493110, AA452887, AI360514, F30158, AI915081, AA568314, AI792575, AA315361, AI054398, AA297195, AA879053, AA338680, AA846923, AI908093, AW081485, AI271762, AA581247, AA572983, AI151081, AI096421, AW403829, AI160786, AW089950, AA600202, AA148656, AA984857, AC008064, AP000117, AF045555, AL033381, AC005821, AC005200, AC005102, AC006160, AC004913, AC004985, AC006065, AF111168, I34294, AC004796, AC005409, U95739, AL080243, AC003663, AC004966, AL035071, AC006487, AL035417, AC003692, AL121603, AL133445, AC005043, AC002316, AC004815, AC002310, AC002115, AC005696, AC005049, AC005071, AC007664, AC000029, AC002472, AC005058, AL079342, AL034555, AP000299, AL109628, AL109758,

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HFPHR82	72	957528	1 - 1579	15 - 1593	AA913364, AW027373, AW305275, AI799031, AW117480, AA588138, AA775450, AW190848, AA411334, AA866178, W61038, AA411335, AA775769, AA769134, AA075643, N30274, AI493881, AA627544, AI147666, AA075644, AA614747, N30309, AA812101, AI025647, AW339918, AI140386, N94919, AI138196, AA868924, AI143201, AA284960, AI347094, AI343592, AI128292, AI017993, AI492556, N41996, N20511, N42630, AI933338, AI554835, W72001, W69402, AI679099, AA040263, T32745, AA872581, N29505, AI268560, AI354734, F28362, AI017992, AA719956, AA448442, AI679673, AA863176, AA444022, AI142803, AA732322, AA993672, AI624135, AI304774, W44314, W37097, AI475118, AI004213, W65308, AA846235, AA448307, AW274816, N25416, AI285067, D79265, W44778, AA305351, AA682603, AA285117, AI186604, AI149185, AI339799, AI872626, AA557809, AA444000, AI344717, AI128110, AA922743, AA996037, N56641, H13966, AA515842, F37123, AA732278, W65338, W76570, AA989130, AI239957, R21057, AA721150, AI580506, R96887, N26843, AA034909, W45686, F09166, H12989, W19542, W69363, N57447, R96888, C04314, AW183468, H87003, AI719584, AI685763, R24370, T35889, AA081676, T34115, N40568, AA010732, AW089136, AW023063, N63592, T35834, AA913531, Z42311, F11505, H05630, AA505347, T35841, T30076, AI366940, T30517, H27007, Z42248, F09167, H87002, AA721261, W56871, T36163, AA040400, W19619, R46237, AA863208, AA649338, F34780, T35871, H13965, AA913094, T35833, AA034976, AI274646, AA890331, N63619, AA082031, F05477, AA603299, AA322616, AA603386, R27044, Z38484, AI564372, F01840, R27043, R27029, AI859366, R27028, AA748381, F01739, AA355325, H53598, AI859362, N46608, AA339209, and AF190797.
HHFOO84	73	857780	1 - 368	15 - 382	
HISAM68	74	1125189	1 - 598	15 - 612	AI733671, AI439165, AI479274,

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HLHDD45	75	942901	1 - 425	15 - 439	AA359864, AW139566, AI129355, AA131594, AI174990, AI288447, AI202581, AA705625, AW391207, AW302196, AW351439, AA094441, AA311362, AI064968, AA373955, R98996, W07340, W21920, AC024148, AC044892, AC044892, AC069253, and AC069253.
HMMAB49	76	1087684	1 - 669	15 - 683	D29160, AW151102, AW272794, AI720141, AI934307, AI291124, AI028510, AW157005, AW270619, AA992126, AI061334, AA558404, AI049701, AI570943, AA262752, AA779783, AW104748, AI365988, C14121, AA176605, AI352078, AW193432, AA501614, AA655013, AW406755, AA955031, AI374809, AI688846, N25303, F29989, AI521679, AI935827, AA347927, AI358229, AA720746, AI291268, AI613459, AI270476, AW193265, AW023672, AI284640, T29180, AW167154, AI580707, AA347930, AI431303, AI628288, AI206785, AW028376, AI281881, AI267356, AI623563, AI471481, AA469451, AI350211, AA206629, AI783911, R87193, AW118529, AI345695, AW192199, AA084070, R79396, AA639025, T47739, F25867, AI267450, AA515224, AA837740, AA278496, H62778, AA177061, AI192631, AW193609, AI336054, AI312790, AW407220, AI358501, AW270258,

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HMSGO27	77	683031	1 - 443	15 - 457	AI499503, AI709066, AI754955, AL042853, AI963720, AI334443, AL042753, AW408717, AW193265, AL119691, AL046409, AI345518, AL037683, AI281881, AI284640, AW303196, AW406755, AI613280, AW088718, AW439558, AL138455, AW301350, AW340844, AL138265, AI345654, AI254615, AI350211, AI133164, AA720702, AI696793, AA503015, AI799642, AL048925, AI568678, AW270270, AL046205, F36273, AW410400, AL041690, AA587604, AA623002, AW274349, AW021583, AI561060, AW407578, AA630362, AI457397, AI355206, AI610159, AI110770, AA491814, AW073470, AI305547, AA507824, AA581903, AW265385, AA610491, AW304584, AI270117, AI249997, AW103509, AI431303, AA468022, AW238278, AL042420, AW028429, AA661948, AI754658, AW072923, AI370074, AW419262, AI345681, AI345675, N27584, AW245747, AA723017, AI708009, AA877817, AI559251, AA610783, AA493471, AI783494, AW020992, AA834667, AI365988, AI537506, AW129001, AA610493, AW276827, R88888, AL048626, AL120687, AA649642, AA569471, AW302013, AA526787, AI370094, T53128, AA828704, R24205, AI633390, F29989, AL046898, AA533725, AI358571, AA490183, AA491284, AA857486, AA551503, AA126035, H90814, AA680243, AW070892, AI623720, AI888518, AL121039, AA525790, AA126051, AA525824, AW167372, AI702049, AW404653, AW438643, AA521399, AA521323, AW327868, AW162288,

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HNHAM52	78	1125710	1 - 866	15 - 880	AJ580306, AA211410, N40468, N48507, D81030, D51799, D80212, C14389, D80164, D80166, D59619, D80210, D80240, D59859, AA305409, D80219, D59927, D51423, D80253, D80022, D58283, D80195, D59502, D80188, D80391, C14331, D59787, D59467, D59275, D80043, D80227, D57483, D59610, D80248, D80366, AA514188,

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HNHEQ86	79	785580	1 - 117	15 - 131	AC024653.
HNHHF46	80	1123883	1 - 1379	15 - 1393	AW137103, AW302615, AA913635, AI765662, T91047, AI525136, AA393986, AI056765, T83834, N59019, AA913173, N53925, AA700668, R08314, R08368, AI580501, AI018028, AW081040, T93861, T83670, AI307635, AW300106, AW300120, AA398023, D88547, and AC008989.
HOECV83	81	1123893	1 - 2304	15 - 2318	AF052496, W07603, D20016, AI140321, AI270499, AA814586, AI753510, AI199086, AI862658, AI810183, AI367789, AI910862, N51917, Z44988, AA876403, AA969919, T16520, F03901, N80870, Z40725, AA174190, N56197, D59695, D52291, D80949, D51079, AI557751, D51213, D80168, D59627, C14298, C14407, D80228, AW352172, C14227, D58246, D80064, D81026, D45273, T03048, D59503, T11417, D81111, D80258, D80022, C14014, AW178777, D58283, C16955, D80014, D80391, AI535686, D80043, D59787, C14077, D80164, D80196, D59859, AA305409, D80212, D80045, D80133, AA514186, D80247, Z21582, Z33452, D51231, C06015, H67866, T02974, H67858, AA514184, Z30160, AL050087, AR016808, X64588, A62298, Z82022, A62300, A82595, and AW474026.
HORBO54	82	870674	1 - 566	15 - 580	AW166235.
HOSFZ73	83	1122896	1 - 619	15 - 633	N57282, AA725075, AI703492, AA100379, W26914, AI540952, AI879394, AI653605, AI696372, AI678785, AI634691, AA086150, AW157492, AI270524, AA160171, AA160172, N67343, AC004020, AW467393, and AW612137.
HPIAU71	84	1123830	1 - 762	15 - 776	
HRDBT72	85	1112136	1 - 846	15 - 860	AI696962, AW271904, AW088846, AA680243, AL042756, AA610491, AW237905, AA651639, AI431303, AI867058, AL040054, AI369580, AI754253, AI732120, AL046409, AW069769, AA469327, AW069227,

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HSDFT51	86	1124582	1 - 1355	15 - 1369	AI422221, AW269213, T11456, H84186, AI142300, AI348147, AA705920, AI657002, AW028877, AA928672, AI587025, W03281, AI765590, AI954911,

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HSDJM56	87	948669	1 - 799	15 - 813	D57175.
HSICX21	88	531267	1 - 364	15 - 378	AC016333, AC016333, AC024101, and AC024101.
HSIDS82	89	531248	1 - 288	15 - 302	AW296375.
HSNAH21	90	571314	1 - 237	15 - 251	AI074638, AA156897, AA405746, AI288884, AI142828, AI434997, AA464691, AI079347, AI141600, AA558999, AI417262, AA524307, AA729535, AA492487, AW453078, AA436613, AA746965, AA923317, AI142582, AA424901, AA156817, AI339241, AI042516, AI097311, AI924831, AI435356, AI743842, AW023128, AA424767, AI751251, R45895, AA585325, T18597, Z28355, D53161, Z32822, AA585098, R29657, AI557807, C15406, D61185, AA585101, Z32887, D57491, D51433, D59751, C15069, R28892, D54897, R28735, R29445, AI557740, Z33559, R28965, AA170832, AI525316, AI557262, AA585378, D60765, AI557864, AI541356, D60844, AI546831, D59458, AI547250, D54850, AI557718, R29218, AI526078, AA585155, AI526140, AI541365, AI525500, D59436, AA585439, AI557727, AI541517, D55233, R28895, AA585329, AA585430, C16294, C16315, AI546971, AA283326, AI541383, AI535639, AI535660, AI541013, AI546999, AI546875, AI557731, Z36724, AI526112, AI541535, AI547039, AI557763, AI526184, AI541205, AI526016, D61254, AI557734, AI541423, D53447, AI525556, AI525114, C16292, C15120, C15762, D52835, R28967, AI557809, D53472, AI526158, AI526191, C16300, AI546921, AA585476, C16296, AI525339, AI526024, AI557852, C16293, AI525306, AI540903, AI526117, C16305, C15737, AI541374, AI541034, AI557084, AI557758,

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HSODC08	91	966264	1 - 1432	15 - 1446	AW007193, N64811, AA452032, AW339062, AW340188, AA401432, AI568619, AW169936, AI680519, AI271472, AA131132, AA400000, AA885882, AI338757, H94846, AA749092, AA406402, AA771971, AI250802, AI499729, W95739, AA975465, AI147856, AI521267, W95717, AA284462, AA902995, AI969258, AI143369, AA668710, AA772776, AA410424, AI278748, AA465528, AI094421, AI280111, AI031849, AI022538, H94904, AA448926, AA932880, AA939066, N50516, AI026050, AA888455, W46552, N50572, AA448961, AA908448, AA970161, AW304057, N63986, AW004817, AA383538, AW192281, AI185874, AA131080, AI376899, AW391424, AA812994, AA383509, T89723, R11866, AI139250, T77066,

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HSPAB58	92	736098	1 - 347	15 - 361	AI718112, AA702244, and H64345.
HSQCM85	93	963554	1 - 453	15 - 467	AL021918, and AL021918.
HTOLA82	94	844319	1 - 401	15 - 415	H04212, AC012446, and AC012446.
HUUDH57	95	931155	1 - 2177	15 - 2191	AI888110, AI248937, AI084822, AI249135, AA361076, AA356078, AW296215, AA897402, AI161293, AI889765, R22164, and AC009073.
HWACV74	96	1145916	1 - 1718	15 - 1732	AI762815, AI702097, AI637581, AW025622, AA814968, AI004348, AW193426, AI635627, AW081066, AI569925, AW276794, AI933804, AI864500, AA483606, AA570740, AA568204, AA879053, AA676592, T50676, F09355, AI133514, AI054397, AC007011, AC004962, AL008719, AP000128, AP000206, AL049869, AC007637, AF003626, AP000245, AL135783, AP000036, AC005094, AC005874, AF134471, AF031078, AF030876, AL031228, AC004686, AC002352, AL096703, AC008154, Z95889, AC003037, AC005377, AC007298, AL009181, AC006390, AC004797, AC004470, AC003663, AL022098, AL031577, AL139054, AC007021, AL034417, AC004912, AC006952, AC002530, AC004664, AL049611, Z68164, AC004890, AC005915, AF015262, AC007563, AC000393, AJ229043, AL031733, AC007263, AC005291, AL049553, M37468, AC005900, AC005013, AC005244, AL031584, AL078638, AC005184, Z93244, AJ229042, AC004383, AF064858, AC005531, AL035420, AC003074, Z93020, AC004963, AC002465, AC006123, AC004778, AL049839, AC005081, AC007392,

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HWAFFW39	97	947915	1 - 518	15 - 532	T27535, AF106037, AF222340, AB011097, AF183569, AC008955, AC008955, AC008963, AC008963, AC008508, AC009073, and AC009073.
HWBBR65	98	1156447	1 - 2238	15 - 2252	AI110760, AL040921, AL048969, AL044339, AL044340, AI608771, AW188427, AW102811, AL037632, AI054414, AW157180, AL138265, AI952885, AI302688, AL048626, AL044489, AW080062, AA223932, AA126635, AL042906, AI791227, AL119331, AI076616, AL042905, AW408643, AI354847, AW243793, AL135377, AI679294, AA134961, AI679871, AA601278, AI732911, AW069819, AI694178, AA487475, AI457389, AI907046, H57596, AI961264, AA736713, AL041013, AI871691, AI816537, AA287618, AA020873, AL138065, AL137984, AA456937, AI917156, AL079869, AL120343, AW405593, AW008089, U51704, AI141202, AL120483, AA084401, AA634991, AA081138, AW401509, AI457152, N76766, AA601503, H77505, AA580560, AA017377, AA831913, AW372037, AI445582, AA527963, AL041895, AA618412, AL038705, AI016192, AA608588, AI583978, N23097, AA706495, AA284247, W96277, AA575852, AA601230, AA584482, AL134338, AI580906, AA586907, AA608612, AA838140, AI581006, AA640277, AI798521, AA297145, AL120269, AW169057, AA984258, AI143051, AA568303, AI801141, AA834799, AI820992, AI734144, AA224525, AA489856, AI433104, AI732128, AI732635, AA568314, N23913, AI913324, AL118925, AI612111, AA613164, AA908687, AI016704, AL043095, AL046746, AL134216, AA130647, H57595, F28204, AA908857, N27362, AI823679, AA862035, AI862802,

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HWMES65	99	969190	1 - 582	15 - 596	AC006237.
HISBG28	100	920850	1 - 901	15 - 915	AA481627, AA883142, AA811592, H65033, AA909711, AI810118, H65034, AW104339, AI016329, U67932, L12052, I22485, U77880, and U68171.
HAJAE60	101	786337	1 - 365	15 - 379	AL046909, AI752624, AA312812, AL047364, M62227, Z21666, T34603, H55171, AA594044, H15984, F08310, AW294651, R57156, T30933, AL008582, U80040, J05224, AF086788, U87928, AF093082, AL023553, and U87926.
HDPDE32	102	1217181	1 - 878	15 - 892	AB026436.
HBDAC79	103	1199232	1 - 582	15 - 596	H23157, AA663798, AA904376, R61429, AA309011, H09004, AA359944, AA448036, and AF126245.
HEMDX48	104	1163778	1 - 2478	15 - 2492	AI810732, AW250381, AW377072, AW377038, AW102948, AI743705, AI991624, AW340866, AI992143, AW439506, AW376973, AA837407, AI066780, AW376941, AW406374, AI624965, AW058422, AI829487, AI184239, AI799640, AI688748, AI127916, AI624945, AA024661, AA579821, AA459167, AI142745, AA836422, AW129372, W70231, AI308802, AA024967, W45358, AI476746, W70232, AW247811, AA649867, F34967, N75289, AI024615, W40274, T23428, AI936808, AI051115, AW352180, AA458956, AW250977, T17318, AA380312, AA593573, AA745075, R49997, AA635874, D81688, AA887790, AA569149, T49848, AI940351, AA176301, AA780919, AA904356, AA362924, W39366, AI961822, R50335, AI909817,

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HHASB48	105	721150	1 - 637	15 - 651	AW250381, W40274, AW247811, and AA380312.
HLWCA17	106	1104762	1 - 1267	15 - 1281	AA045807, AA045901, N53982, R20987, AI378617, AA807086, AI379690, H87566, W58038, W30784, AW392670, AL119457, AL119324, AL119355, AL119319, U46351, AL134531, AL119341, AL043019, AL119484, AL119391, U46350, U46347, AL134536, AW372827, Z99396, AW384394, AW363220, U46349, U46341, AL119497, AL119522, AL119418, AL119363, AL119401, AL037205, AL119443, AL119439, AL119444, AL119483, AL134902, AI142131, AL134527, AL134525, AL119396, U46346, AL119335, AL134920, AL042544, AL119399, AI142139, AL119496, AL134538, AL042433, U46345, AL043008, AL042984, AL042542, AL042614, AL119464, AL042975, AL042450, AL042965, AL043029, AL043003, AL042551, AB026436, AR066494, AR054110, AR060234, A81671, and AR069079.
HNTTD09	107	1104487	1 - 926	15 - 940	D78809, AA377051, AA045359, N53982, AA045901, AA258499, and AA258335.
HSKDT07	108	927823	1 - 1104	15 - 1118	AW377072, AW377038, AW376973, AW406374, AA024967, AA459167, AI940351, AA362924, AW352180, AW376941, R49997, AI961822, AI909817, W70231, AI066780, AI810732, AI127916, D81688, and AF078854.
HSRDB26	109	1102231	1 - 645	15 - 659	
HAPBS07	110	967325	1 - 742	15 - 756	AA284453, AA481096, AA465418, W17165, AW405741, AW404541, AA304808, AR028677, AF067174, and AC007556.
HAUAI17	111	921674	1 - 1010	15 - 1024	AI742586, AI823636, AI738645, AI570505, AA994212, AW166260, AI472051, AI689840, AI819324, AI802140, AI808204, AI018575, AI708063, AA044874, N33369, AI458889, AI798664, AI694439, AI742084, AA996109, AI268684, AI051014, AI005161, AI126407, AW295897, AI625938, AW418896, AA044826, AI564776, AA983545, H92520, AI379936, AI373261, AA317357, AW139306, AI521441, AI264270, AI498702, AI244808, AI948596, H77889, AW135452, AI021975, AI985535, AW242712, R00296,

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HBCBT19	112	959953	1 - 758	15 - 772	W58728, AW194384, AI921843, AA131986, W27452, AA861776, AW025219, AA366467, AA969204, AI077983, AI688167, AA805925, AI939498, T82046, AA026664, AI627470, R71811, AW316534, AI189664, R60094, AA007217, R53357, AA335794, AI401269, AI024367, AA131681, AA505874, AI200318, R71771, W24578, AA026712, AI676036, AA806045, AI299373, AI890667, AW118903, H29874, N92383, H92161, AI267768, AW075217, AA918168, AI885357, AW372475, AW172330, AA844743, AI149118, AI453474, AI357518, and AI262961.
HBCPT10	113	957631	1 - 1278	15 - 1292	AI131178, AI073401, AI087304, AW001150, AI870504, AA632131, AA527353, AI268314, AI199367, AI279189, AW419191, AA293161, AA639837, AI859436, AA777588, AI936230, AW071823, AA809698, AA528107, W72175, AA719229, AA809330, AI333884, AI138637, AI202785, N33080, AI299098, AA527330, AI826773, AI026030, AI291245, AA782731, AA932449, W51877, AA429946, AA931756, W76461, AA135492, AA714047, AA977092, AA293652, AW245862, AA890559, AA306873, AA564285, AI041789, R88664, AI419007, AA088221, AI537756, AA255746, AI038212, AA262033, AI147591, AA991254, AI582859, AA988303, H41229, AW068962, N44651, H43006, AI312065, AA634846, T15928, H44946, AA305881, R89745, AA738454, H45675, AI086798, AA740304, AI092660, N31513, AI183882, T23541, H38430, AA158212, AA010261, AA088641, AI608659, AI673592, AI824292, AW245604, AA758471, R30908, AI183678, AA293757, AI023829, AI202407, AI718345, AA860798, AA953640, AI635433, R96843, AA505675, R25850, H66091, H45715, AI382577, H44992, AA988157, AA010478, AA307570, AA774916, AW248398, AA374350, R88663, AA137171, AA458763, R30862, AW206472, AI823690, AA092403, AW449148,

					AW274454, AI557426, AI541056, AF044127, and AL136295.
HBGDA14	114	866258	1 - 879	15 - 893	AC024580, and AC074220.
HCHNJ32	115	934848	1 - 899	15 - 913	AI991112, AI573258, AI589871, AI382182, AW168298, N63300, AW245578, AW245568, N30214, AI244679, AA442766, AI015935, AA625514, AA714315, AA613669, AI669114, AA433946, AA568688, AI808444, N63050, AA813327, AI281530, AI885837, N52392, AA811995, AA492250, AA507560, AI221056, AI083879, AA446582, AA720021, AI557529, AI085835, AI557530, AI304532, AA313563, AA305352, AA838602, AA430753, AA573777, AI304455, AA782093, AA446709, AI690776, T73332, AA885566, AA573537, AI566973, AA720002, AA861893, AI283278, AI304454, AI199547, H72469, AI160878, AA531050, AI472891, W00555, N32117, W00611, AI937637, N54353, H95032, H78356, AI571328, T61807, AA876623, AW204782, N78252, H65466, AI004311, R50529, AW138834, H64869, F21642, AA086353, AI264256, AA652483, AI859175, H85048, AA418354, AA501347, T61353, AA134203, T55136, H91692, AA431169, T60510, AI141454, Z30219, AI985397, H93999, AA855127, R50625, H72870, AA291581, AA293323, AI858739, T73417, AW150864, H73548, C00330, H91789, T98646, AW300104, R86214, AA432189, AI382568, H77954, AA918480, T73347, T72288, AA478304, N59791, AI251780, F15963, AA478363, T72293, AW207071, T71510, AA230200, AI918444, AI927580, AA134202, N88648, AA974081, AI954738, AA429728, Z20777, N56787, N72798, AA541321, AA641099, T73399, T71348, H84670, T98698, AI567583, AI126088, AW440575, H78357, T72864, AA983562, Z20778, N40867, AA229346, H47484, T71167, AA230291, T72848, AI470293, AI570966, AL042384, AW168823, AI358042, AI805688, AA603709, AI869377, AI567637, AI697324, AI335426, AI348777, AW148716, AW189415, AI241792, AI678762, AW262565, AI537617, AI800453, AI500039, AI624293, AI932818, AI648684, AI345688, AI494201, AI249877, AL040241, AI623682, AI446124, AI680280, AW169624, H42825, AA464646, AI573026, AW058233, AW130849, AI570997, AL046356, AW117919, AI249962, AI310500, AI699011,

					AI567944, AI285586, AW088899, AI682891, AI539153, AI865334, AI280661, AI950688, AI919345, AI612813, AW089258, AI701975, AI073952, AI610645, AI696819, AI537837, AI783861, AI468872, AI680498, AI364788, AI698401, AL037558, AI587606, AI336575, AL079960, AI926878, AW088903, AW151714, AI933992, AW129230, AI567612, AI866770, AA848053, AW059713, AI866082, AI589428, AW085786, AI934276, AI539771, AI811344, AI829990, AI677797, AI625464, AW191844, AI249946, AI862024, AI866469, AW265004, AI859464, AW021373, AI918500, AW193203, AA613907, AL039390, AI922577, AI874151, AF113123, AR009500, A74991, A74992, AL080127, X93495, AL122098, I26207, I89947, I48978, AF183393, AL117432, X84990, Y11587, AI8777, AF087943, Z82022, AL050393, AL133067, E03348, E03349, AR059958, U77594, AL137463, AF111851, I17544, AL122111, A08916, A08913, AL137705, I89931, S68736, A08912, A08910, I49625, X79812, A08909, AB007812, AL133010, AR038854, A08908, Y10080, AF012536, AL049382, X80340, AF159615, AL133014, U72620, AR011880, AL137556, AL122118, X53587, AL080074, I03321, AL117578, S61953, I48979, M27260, AL122093, AJ005690, AF119337, AL137526, U49434, AL110197, AF017152, U96683, AL049465, AL080137, AL080148, AL137300, AF111112, AF162270, AF113019, AF065135, S69510, AF030513, AL122121, AF081197, AF081195, I89934, I89944, AL110221, AF017437, Y11254, AL133645, AF113691, AL110222, AL137557, AF090900, AL137480, AL137476, AL080060, AF113689, AR038969, AF113677, A65340, AL133093, AF118070, AL122050, AL080154, I42402, AB025103, X52128, AL137712, AF113676, AF158248, U80742, AL133565, AF026816, AB019565, AL122110, AF003737, AF100931, AL122049, I09360, AF067728, E15324, U58996, L30117, AL133077, AL117440, AL117435, U35846, A03736, AF182215, AL110280, A21103, AL137429, L19437, X87582, E05822, AF132676, AL133640, AL137271, AL122106, AF061836, AL137538, AL133075, A45787, I66342, AL137547, AL137527, AL137294,
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HCHON59	116	931082	1 - 2401	15 - 2415	AW299683, AW152065, AA315514, AA305116, AI961078, AA210776, AW236710, AA622988, R56767, W04752, AA781427, R25303, R89462, R96008, R18161, N76920, AA694165, R24760, AA740627, Z19446, AW074408, AA345403, AI076025, AA348726, T86393, AA875871, AI224620, AI916251, T99947, AA337010, AI077381, AA749291, H17194, T79510, AA004316, AA363905, AA815288, Z25140, AW044490, R89463, R17355, H17900, T98732, AA054853, AW085956, AA211903, AA716584, AW297867, Z20433, AA133996, R95999, H52630, AF029260, and A74519.
HCUGN19	117	716989	1 - 584	15 - 598	R83518, H01355, R83503, AA204689, AI990886, AI660160, H45024, AI300806, AI969915, AI927423, AI457940, AI744631, AI928256, AI380503, AI867197, AW237763, AI800708, AI588959, AI765531, AW300271, AI830241, AI762594, AA828477, AW058189, AI871379, AI740633, AW301155, AA937166, AW316942, H44971, AA804639, AA535256, AW071230, R31122, R65687, H01309, H28671, AI829069, AA767789, AA953355, AW138552, AI870155, AI092045, and AA207090.

HCUGR38	118	706471	1 - 332	15 - 346	
HDPND85	119	852628	1 - 841	15 - 855	W58472, W58514, T49180, AI356759, AW351512, AC003042, AC003042, and AC003042.
HDPRN38	120	883658	1 - 811	15 - 825	AA232176, AA232159, H84466, AA332911, and AI765848.
HE8AM92	121	952610	1 - 643	15 - 657	AA071290, AI830204, AI344107, R54083, AI764987, AI921148, AA815201, AI361541, AA122312, AI284342, R60683, AA399256, AW004629, T65297, AA350782, AA337811, N46213, AA151813, AA888883, F02683, F10790, F03793, H29594, R40964, R39944, R48971, W20302, AI734217, T36239, R41712, F11810, R44252, R44573, R50366, AI668657, AA331654, AA577350, F03445, AA328526, F01488, AI284343, F01581, AA334776, T25071, AA386170, F02156, AA748545, T31990, F01582, F01520, N23786, AA779556, AA425224, AJ243721, and AF182814.
HE9RE21	122	888243	1 - 972	15 - 986	AI589113, AI120391, AA326268, AA224260, R83178, T78371, AW136392, AA317066, AI133216, AF162762, AF098786, AF162760, AF162759, AF162761, and AC040908.
HETKH30	123	884009	1 - 925	15 - 939	AA436699, AA442502, H25167, AA306355, H11845, and AA584520.
HHAME78	124	840939	1 - 413	15 - 427	AA430753, AW245568, AA625514, H72469, AA446709, AI885837, H95032, AI991112, AI382182, AA313563, W00555, R86214, R50625, W00611, AI589871, N78252, AA305352, H64869, AI573258, N30214, H78356, T60510, AA507560, AA613669, N56787, AA429728, AW168298, AI015935, H91789, N63300, H73548, H84670, AW245578, AI244679, N63050, N88648, T72288, AI669114, N52392, Z20777, Z30219, AA714315, AA433946, AA442766, AI808444, AA641099, AA568688, AI557529, AA813327, AI557530, AA492250, T72293, AI083879, AI221056, AI937637, AW440575, AA720021, AA446582, AA782093, AA134202, AI304532, T71510, AA418354, N40867, AI281530, AI304455, AA855127, N72798, T73399, AA573777, T73332, AA811995, T98698, AA838602, AI085835, H47484, AA652483, AI304454, AA720002, AA885566, AA531050, AA573537, AA918480, AA861893, AI199547, AI160878, AA876623, AI283278, AI690776, AI566973, AI472891, AA230291, H65466, T61353, H84633, N54353, T61807, F21642, AI571328, N76319, H91692, T71348, AF113123, AR009500, and A74991.
HKABI68	125	856590	1 - 548	15 - 562	AW249217, AA534535, AA115832,

					AA315785, AA429231, T08490, AW404684, Z42191, AA336855, AC007606, and AC007606.
HKMLN95	126	914083	1 - 1965	15 - 1979	AA551127, AI692457, AI765517, AI749951, AI631959, AI129348, AI949762, AI672100, AI609235, AI950134, AI692456, AI651144, AW189207, AI935651, AA868261, AI151427, AA044198, W63627, AI521732, AI949853, AA161274, AW300441, AI708643, AA868518, AI962729, AI150783, AI015909, AA595810, AI281874, AI819752, AI479243, AI745688, AI341421, AW022195, AW027973, AA132312, H99174, AA429830, AA070213, N52408, AI913890, AA856798, AI745679, AI554270, AA442125, AA554278, AA161275, AA702375, AW016589, N24457, AA070298, AA969821, AI635327, AA699477, AI458226, AA043064, AI982949, AW439708, AI687133, AW272645, AW177545, AA946996, AW341771, AW177556, AI342767, R99590, N95053, AW402507, AI074359, AI630618, H84183, AA557498, R25323, AA446257, R43298, AW243239, AI583569, AW194714, AA551069, R92184, AA557798, AI433955, AA714014, N66644, AI824194, R87671, T57956, AA313194, AI921595, AI208421, T57874, AA027072, AA156655, R87665, AI370681, R14400, AA352103, R87659, AA860614, AI140574, R24026, N58584, R87672, Z38717, AI870045, AW151040, R84296, AA542839, AI277638, R92288, AA307482, AI954284, AI472463, N67635, AA442124, R18926, R84303, AI632684, N72814, AI472552, Z42525, R84309, T94235, R26521, AA091407, AA876334, T26330, AA565557, AA609829, N53150, AF078850, U81186, and AF064635.
HMCFA91	127	959954	1 - 1073	15 - 1087	AW194384, AI921843, AW025219, AI024367, AI688167, AA861776, AI189664, AI627470, AW316534, AI200318, AA969204, AA505874, AA805925, AI077983, AI401269, W58728, AA026664, AI299373, AW075217, AI676036, AI890667, AW118903, AI937114, AA573507, AA131681, AI453474, AW372475, R71771, R53357, R60094, AI149118, AA844743, AA918168, H29874, AA007217, H92161, AI262961, AA131986, T82046, AA806045, N92383, AA335794, AI024365, AI939498, W27452, AA635601, AA766069, AW243229, AW166051, AA366467, AI267768, AI572256, H92160, and R71811.

HNTBF75	128	836701	1 - 402	15 - 416	AI659901, AF078850, and U81186.
HPTGB43	129	726460	1 - 492	15 - 506	AA573537, AI160878, AA885566, AA861893, AA433946, AA568688, AA811995, AA442766, AA838602, AW168298, AI283278, AI015935, AA782093, AI472891, AI199547, AA573777, AI085835, AI669114, AI690776, T61807, AA652483, AA086353, AW204782, AI004311, AI566973, AA501347, AI281530, AA876623, AI589871, AW138834, AW245578, AA613669, AA714315, AA813327, AA507560, N52392, AA492250, AI221056, AA446582, AI083879, AI304532, AI304454, AA531050, AA720002, AI304455, AA720021, N54353, AA418354, AI937637, AI573258, AI382182, AI557530, AI244679, AI557529, AA305352, N30214, H85048, AA918480, AA230200, AI571328, AI859175, AI264256, F21642, H65466, AI991112, H91692, C00330, T73417, N63050, H93999, AW300104, AI885837, AA134203, T71348, AI808444, N32117, AI985397, AA855127, AA431169, T55136, AA291581, Z30219, T73332, H72870, H77954, N63300, AI141454, AA293323, AA432189, AW150864, T61353, T73347, AA229346, T72864, N88648, AI251780, AA641099, AA625514, R50529, AW245568, H78357, T98646, F15963, AA430753, H72469, AA313563, H85040, AA446709, AA938645, AA522761, AF113123, and AR009500.
HPTVL90	130	509487	1 - 322	15 - 336	AI694439, AI742084, AI808204, AI458889, AI005161, AI472051, AI126407, AA994212, AI564776, AI379936, AA044826, AW418896, AA335622, AI308950, AI948596, AA996109, AI798664, AI689840, AI802140, AI570505, AI268684, AI738645, AI708063, AW166260, AI742586, AI819324, AI018575, AA983545, AI051014, AI823636, AI498702, AI948603, and AF126781.
HSKIA89	131	837986	1 - 909	15 - 923	AW204099, AA314747, AA249613, AW301249, AI261562, AA775742, AA609749, AI446434, and J02649.
HTXGF27	132	695766	1 - 1283	15 - 1297	AI935291, AI565606, AW055263, AA827998, AA134925, R71442, W73084, W37623, AI376157, AW071733, AA760869, AW084636, AW084135, N40260, W37624, AA621956, AI261507, AI024926, AA576858, AA782442, AI753564, W73188, AA457140, AI362706, AI088401, W37568, N80584, AA100989, AI870558, AA552108, AA464487, AA577315, H99262, N42314, AA135041,

					AA099421, AA917378, AI955891, AW009052, AI865605, AI811602, W37443, AA506577, N28234, AI564918, W00732, H56180, AI784357, W07706, AW407317, AI571677, T64405, AI018764, AA297089, R71095, AA297614, F19530, AA628651, H56396, AA588512, T64219, AI291707, R39750, AA622681, R36668, AI564962, AA814874, AI868306, AW247018, AA082510, C00495, AL117567, and AF151851.
HWHHW5 4	133	684125	1 - 1134	15 - 1148	AI537869, N58734, R97517, N65985, H59433, AA022869, H70636, R97516, AA011230, AA443442, AA057027, W05627, AW192697, AA808430, AA780044, AI022809, AI041819, AI986294, AI336274, W39201, AA883903, AI073467, AI740785, AI871953, AI521233, AW009412, AW157214, AA554447, AI742678, AA863294, AA937977, AI589839, AA595998, AA689601, AA932317, AW152255, AA886725, AI669406, AI034240, AI925407, AA036917, AI887353, H47150, AA846564, AI127132, AA978039, AI139401, AA806498, AA443308, AI338458, AI042442, AA890338, AA992867, AA463838, AI085301, AI263340, AA026818, AI277999, AA917926, AA854105, AI080542, AI348041, W07723, and AA460271.
HWHPO29	134	857383	1 - 657	15 - 671	AL049779, and AL049779.
HWLPR94	135	967326	1 - 484	15 - 498	AA304808, AI041126, AR028677, and AF067174.
HWLUL28	136	925331	1 - 738	15 - 752	AA312283, T85523, F06560, AA669475, and AF044574.
HWLXT48	137	957630	1 - 440	15 - 454	AA932449, AA306873, AA305881, AW245862, AA088641, N44651, N31513, R25850, R88663, AW248398, AI073401, AA137171, AW449148, AI824292, AL136295, and AF044127.
HBGMD15	138	1103922	1 - 641	15 - 655	AW178905, AW177440, AW360811, AW375405, AW178907, AW178893, T03269, AW366296, AW177733, C14389, AW179328, D58283, AW178762, D59859, D80022, D50995, C14331, D80166, D80195, D80193, D59927, D59467, D51423, D59619, D80210, D51799, D80391, D80164, D59275, D80240, D80253, D80043, D59787, D80227, D59502, AW377671, AW378532, D81030, AW375406, AW378534, AW352158, AW377676, D80024, D80212, AW179332, C14429, D80196, D80188, AW377672, AW179023, AW178908, D80219, AW352171, AA305578, C15076, D80038, D80269, AA305409, D80366, D57483, D51022, AI905856, D50979, D81026,

					D59889, AW177731, AA514188, D80248, AW352170, AW378528, D80045, AW179019, AW179024, AA514186, D51060, AW178906, D80522, C14014, AW179020, AW178980, D80133, D80439, D80247, T48593, D80132, D80268, D80134, D80302, D51097, D51103, D58253, C06015, AW378533, D45260, AI525913, D89785, X67155, A84916, A67220, A62300, A62298, Y17188, A78862, D34614, D26022, AJ132110, AR018138, AR008278, Y12724, AF058696, A25909, D88547, AB028859, X82626, AR025207, A94995, I50126, I50132, I50128, I50133, AR066488, Y09669, AR008443, D50010, A82595, AR016514, AR060138, A45456, AR066487, A26615, AR052274, AB012117, AR060385, AB002449, D13509, A43192, A43190, AR038669, A30438, I18367, AR008408, A85396, D88507, AR066482, A44171, AR060133, A85477, Y17187, I19525, A86792, A63261, X93549, A70867, AR062872, AR016691, AR016690, and U46128.
HNGMA91	139	789744	1 - 356	15 - 370	D80045, AW366296, AA585439, AW375405, AI535639, AI535660, AI905856, T18597, AA585325, AI536138, R45895, AW177440, AW377671, AA585098, AW360811, R28735, R29445, Z32822, R29657, AW178893, T03269, AA585101, Z32887, D57491, D59751, C15406, R28892, D53161, T48593, C14389, AW179328, D81026, AW179023, D80522, D61185, C15069, R28965, D58283, AA305409, AA170832, D59859, Z33559, D80022, C14331, D80166, D80195, D80193, D59927, D59467, D51423, D59619, D80210, D51799, D80391, D80164, D59275, D80240, D80253, D80043, D59787, D80227, D59502, D80133, AW378532, AI525316, AI557262, Z28355, D81030, D54897, D60765, D60844, D80269, AI557864, AW360844, AI541356, D80212, D80366, AW360817, D80196, D80188, AW178906, D80219, AW375406, AW177501, R29218, AW378534, D80248, AW177511, AI557763, AW179332, AA585378, AA305578, AW377672, AW178905, AW179019, C15076, D80038, D59610, AA585155, D57483, D51433, AI526078, C14429, D51022, AI526140, D50979, AI541365, AI525500, D80251, AI557740, D50995, D59889, AW352117, AW178762, D54850, D80024, D59436, R28895, D51060, AI541535, AI546831, AW179024, C14014, D80378, AW352158, C16294,

					C16315, AI546971, AI547250, D59458, AW352171, AI541383, AI546999; AW377676, AW178775, AA283326, AI557718, AW352170, AW177731, AW178907, D80241, AA514188, R28967, AI541517, C16292, AI546875, AI547039, D55233, AI557731, C16300, AA514186, AW367967, AW177505, D61254, AW179020, D53447, AW360841, AI557734, AW179018, AI525856, AW176467, AI557727, AI541205, C15120, C15762, AI526184, D52835, AI525556, D80268, AW178909, AW177456, AW179329, AW178980, D80302, AI557084, D53472, AW178983, AW177733, AW378528, AW178908, AW178754, AA585476, AW352163, Z36724, AI541013, AI526016, AI525339, C16293, AI525306, AI526109, AI526117, AI541346, AI557809, AI540903, C16305, C15737, AI541374, D60730, AI557807, AI541034, C16296, AI547202, C75259, D80439, AW179004, AI526112, AI557787, AW178914, D80247, AW378525, AW352174, AI546945, AI525431, AW360834, AI557533, AA585356, AW378540, AI557852, AA585430, AW178911, AI557758, AI526194, AI547196, AW352120, D80132, AI557408, AI541523, AI546921, C05695, AW178774, AI541307, D80134, AI525320, AW378543, A62298, AR038855, A82595, A62300, A84916, A94995, AR018138, AR062871, Y17188, A25909, A43190, AR016514, AR031365, A67220, D89785, A78862, D34614, D26022, AJ132110, X67155, AF058696, D88547, Y12724, AR008278, AB028859, I19525, X82786, Y09813, X82626, AR008443, Y17187, AR038669, I50126, I50132, I50128, I50133, X76012, A44171, A30438, AR025207, AR066488, AR060138, A45456, A26615, AR052274, Y09669, AR060385, AB002449, AR066487, A43192, AR031358, AR066490, D50010, I18367, AB012117, AJ243486, AR017826, A63261, AF082186, AR038762, AJ244006, AJ244005, Y16359, A70867, X68127, X81969, Z32836, AR054723, AR008408, D13509, AJ244004, X55486, A20702, AR062872, AR062873, A20700, D78345, A85396, AR066482, AR060133, A43189, A43188, D88507, AR003381, AR016691, AR016690, U46128, AF213384, A85477, A86792, AC005913, Z30183, AR017907, A64136, A68321, AJ244003, X93549, AF006072, X82834, AR050070, I14842, A82593, AR054175, U79457, AF123263, L36913,
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					and AR008382.
HSLEI57	140	1103672	1 - 627	15 - 641	AW177501, AW177511, AW177440, AI905856, AW366296, AW178893, AW375405, D51097, AW377671, T03269, C14389, AW179328, D58283, D59859, D80022, C14331, D80166, D80195, D80193, D59927, D59467, D51423, D59619, D80210, D51799, D80391, D80164, D59275, D80240, D80253, D80043, D59787, D80227, D59502, AA305409, AW378532, AA305578, AW360811, D80248, AA514188, D80132, D81030, D80269, D80212, D80366, D80196, D80188, D80219, D80134, D80038, C15076, D57483, AW375406, D59889, AW378534, AW179332, AW178762, AW377672, AW179023, AW178905, D81026, AW352170, AW177731, D80522, AW178906, D80133, AW178775, AI535850, AW179020, AW377676, C14014, AW352171, AW179004, AW179329, AW367967, AW178907, AW178908, D80045, AW179019, AW179024, AW178980, D58253, AA514186, T48593, D80439, D80247, AW378528, A84916, Y12724, X82626, A67220, D89785, A62300, A62298, Y17188, A78862, D34614, D26022, D88547, AJ132110, AR018138, AR008278, X67155, AF058696, A25909, AB028859, A94995, I19525, X93549, AR025207, AB012117, A85477, A85396, D88507, AR066482, A44171, A86792, I18367, AR066488, A82595, AR008443, AR016514, AR060138, D50010, D13509, A45456, A26615, AR052274, and AB002449.
HSLFE21	141	1103524	1 - 1152	15 - 1166	
HSLIE40	142	1105422	1 - 497	15 - 511	
HTXHA35	143	1152110	1 - 924	15 - 938	AI707816, AI523073, AA150070, AA393871, R48107, AW002940, AA449214, AA372202, R05612, AA310756, R52299, AA361396, AA425098, R77016, AF151821, and AB015724.
HAICS07	144	1105538	1 - 846	15 - 860	H16089, AA431225, and AA432247.
HBKDN33	145	1167313	1 - 1001	15 - 1015	AA099783, H54765, H56600, R21717, AA464329, W69565, W72942, N73344, N73216, R20503, AA285107, H96024, AA284952, AA131052, AF216873, and AL049709.
HBODH62	146	1228278	1 - 3284	15 - 3298	AW170529, AI569739, AI684951, AW408053, AW262667, AA936961, AW129510, AI161063, AI565468, AI193147, AI198432, AI148726, AI168487, AI086481, AW089488, AW024920, N67766, AW025667, AI333983, AI333014, AI983417,

					AI018650, AW007194, AA811890, AA993603, AI202461, AA580377, W03611, N62890, AI161057, AI300259, AA393307, AA469272, AW403243, N77799, AI478819, AI241110, F24483, AA469350, H64730, AA398596, AA554637, T89688, T75294, T74061, AW024994, H65220, AW084564, F09996, AI762466, AA776574, F12376, AI356425, T23633, T23643, R57093, AI361179, AW134803, N87378, AI832144, AA453016, T89511, AL079802, AA912043, AA367754, AI499835, AI419826, AI564259, AI370623, AI590043, AI254731, AI698391, AI628325, AW105296, AI421149, AI638644, AI422002, AW044367, AL046466, AW262552, AW075382, AI799183, AW188525, AI619820, AI890507, AI678623, AI699823, AW089844, AI282669, AI568293, AI933992, AW050850, AI364167, AI866469, AI884318, AI250353, AI522256, H95782, AI624624, AW192300, AI540754, AI349482, AI634305, AI621341, AI678324, AI633125, AI538564, AI358462, AI915291, AW152182, AI582932, AI114703, AI889189, AI927233, AI539847, AI421252, AA102339, AI869765, AI540350, AA877314, AW087538, AW198021, AW169634, AL038437, AI075885, AI701097, AW004606, AI656428, AW302960, AI499570, AI630932, AI673140, AI270183, AI434731, AI521005, AI284060, AA114281, AW128834, T69241, AI624293, AI287827, AW104666, AL039274, AW029566, AI524663, AW166870, AI567769, AI819522, AI683563, AW006032, AW104719, AI612913, AI857299, AI473536, AA831128, AI581362, AI634457, AI582966, AI674904, AW102794, AI695857, AI925541, AW080700, AI638798, AI332957, AI884459, AI282865, AI884303, AI685724, AI816306, AI392793, AL035661, AL080312, I89947, A07588, Z13966, AF106657, AF076633, S82852, AL117587, L35261, U97675, AF115410, AR038854, A52184, Z97214, AF126488, AF013214, AL080159, AF080068, AF222801, AL137284, AL110280, I48978, AL137716, AL137271, E01314, U35846, X82434, A41579, AF183393, AF100752, A15345, A77033, A77035, A58545, AL133062, AF061981, X69026, AF129131, L10730,
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					AF177401, X99226, I48979, S36676, AL080146, Z82022, AF060866, X68497, X78627, AF124396, U95114, AL137530, AF172400, AF106697, AL122100, and AF184965.
HCEPJ44	147	1157810	1 - 899	15 - 913	AA326315, F11730, and U15976.
HCWCM65	148	1105668	1 - 699	15 - 713	
HDQDY52	149	1182322	1 - 771	15 - 785	AW015554, AW139739, AA284952, AI478494, AA918422, AL049709, and AF216873.
HEEAA32	150	1203140	1 - 1920	15 - 1934	AI733019, AI821967, AI401824, AI305817, AI248775, AI791417, N63067, AA769662, AI636297, AI436700, AI373787, AI279773, AI823325, AI913400, AI431755, AW271322, AA873330, AW006890, AI433320, AW027962, and AW772149.
HEGAN70	151	839719	1 - 891	15 - 905	AA995279, M78884, and AB023151.
HFKMF42	152	1104119	1 - 1544	15 - 1558	AW025904, AW008529, AI680826, AI743467, AI083911, AI950071, AI015927, AA805175, AA251134, AA310596, AA603773, AA516361, F08785, AA953720, AI701937, AA852503, AA687875, AI873898, AA251198, AA742963, AI087970, Z41828, AA931078, AW131728, AW204102, AW244102, AA948773, AA283246, AI929279, AW081255, AI473598, AI468872, AI699011, AI866608, AI758528, AW088899, AI273843, AI446373, AI343059, AI349933, AI932638, AI345608, AW089179, AW088903, AI491783, AL040241, AI474107, AI539771, AI280561, AI537677, AI673256, AI251830, AI284020, AI610362, AI621362, AW072930, AI284509, AI289629, AI538342, AL119836, AI872724, AI825956, AI636445, AI345471, AW088134, AI950664, AA420722, AI453339, AI682968, AI929108, AI933785, AI174591, AI366549, AI636719, AI539153, AI567360, AI802240, AI611743, AW083804, AI866770, AI696626, AI589993, AW059713, AI885999, AI783792, AI475151, AW148414, AW118398, AI687630, AI828731, AA579232, AI498579, AI312428, AI868831, AW073994, AI862144, AI277008, AL038529, AI648663, AW190042, AI679321, AI273048, AI500662, AA613907, AW085799, AI682743, AI919345, AI364788, AI554427, AI524607, AW131952, AI591316, AA572758, AI538885, AI684234, AI888944, AI500146, AA176980, AI274013, AW403717, AI916419, AI568765,

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					A93016, A07588, AL133075, AL050146, S77771, AL122121, AF106862, AF008439, AC004227, AL133558, AL122111, I17767, AF158248, AL137548, E07108, U87620, AL133016, AF113676, AL137660, AL133113, AR034821, AL137648, A12297, X93495, AF118064, AL137557, AF118070, AL137271, I03321, AL133557, AF146568, AL050393, AL133565, U72620, E02152, AL117435, AF118094, AL049938, AL080159, Z37987, AL035458, U57352, U00763, AL133560, AL080124, Y10655, AF113019, X82434, L19437, Y16645, AL049283, A77033, A77035, AR029490, AL117460, AF090903, AF125948, AF090901, U35846, S78214, X72889, AF113013, A58524, A58523, AF067790, AF113690, AF090934, AF090943, I09499, AL050108, AL122123, AF078844, AL049464, AL122110, AL110196, AL049466, AL049452, AF090900, AL050116, AL137550, X65873, AF079765, Z97214, X98834, AL117648, AF113694, AF091084, AL133067, AF017437, AF113677, AF097996, Y11254, AJ000937, AL133080, AL049430, X70685, AL049314, E02349, AF111851, AL117583, AF176651, AL137459, AF120268, AJ242859, AJ238278, AL117457, L31396, AL096744, A08912, AF177401, AL110225, AF016271, AF090896, AL122093, U42766, AL133606, A03736, L31397, X63574, X96540, AL110280, E07361, I89934, AC004686, A18777, AF087943, AF118090, AB007812, U68233, I92592, AL122045, I66342, AF102578, E15569, AF061943, AR038854, AF026816, I18355, I34392, A08908, AF185614, S76508, AF119337, AJ012755, AL137558, X83508, AL050170, AR068751, AF067728, U49908, U53505, S83440, AL133568, AL137429, E03671, AF069506, AF079763, M27260, AL080126, AL133072, AL137521, U91329, D83989, L13297, AL137523, AF159615, A07647, AL050092, I00734, S75997, S63521, X79812, AL133645, X89102, U96683, AF090886, X99717, E00617, E00717, E00778, AL137658, AL110159, AF003737, A65336, AL050172, AL133098, AF094480, AL080140, and AJ010277.
HFPHG06	153	1104964	1 - 436	15 - 450	AA585101, AA585439, AI541374, AA585476, Z30131, R29445, AI525431, C16305, AI541365, Z28355, AI525556, T11028, AI540967, AI526140, T41289, AI526073, D61254, C16300, AI541523, D57491, AI546999, AI547039, AI557731, R29218, AI546945, AI541514, D55233,

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HHEMB89	154	1227613	1 - 3551	15 - 3565	AW007194, AW170529, AI569739, AI684951, AW408053, AW262667, AA936961, AW129510, AW024994, AI161063, AI356425, AI565468, AI762466, AI193147, AI198432, AI148726, AI168487, AI086481, AW089488, AW024920, N67766, AI333983, AI333014, AW025667, AI983417, AI018650, AA811890, AA993603, AI202461, AA580377, N62890, AI300259, AI161057, AA393307, W03611, AI478819, AI241110, AA469272, AW403243, N77799, F24483, AI499835, AA469350, H64730, AA398596, T89688, AA554637, T74061, T75294, AW242634, AW084564, H65220, AA776574, F09996, F12376, T23633, T23643, AI361179, AW134803, R57093, N87378, AI832144, AA453016, T89511, AL079802, AA912043, AA367754, AI419826, AI687568, AI370623, AA916133, AI421149, AW105296, AI638644, AI590043, AI254731, AI538085, AI560004, AI803937, AI307285, AI247267, AI364167, AI287476, AI499623, AI522256, AA279341, AW044367, AI349482, AL046466, AI590549, AW075382, AW262552, AI799183, AI287326, AI302775, AI866469, AW188525, AI422002, AI540350, H89138, AI619820, AW130202, AI678623, AI890507, AL039011, AI699823, AI927233, AI282669, AW050850, AI364592, AL080011, AI695857, AW080700, AI638798, AI884318, AI250353, AW166870, AI798456, AW004606, AI537024, H95782, AI656428, AI624624, AI570807, AW192300, AI673363, AW262491, AI890628, AI440422, AA788861, AI829327, AI927899, AI919600, AI688241, AI538564, AI915291, AI636588, AW152182, AI471325, AA835851, AI582932, AA729017, AA019328, AI583578, AI889189,

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HLDPC46	155	466567	1 - 668	15 - 682	AI791417.
HLDRG44	156	1106225	1 - 2229	15 - 2243	AI263099, AA865601, AI310515, AI310517, AW275359, AW129211, AI671382, AA862395, AI245451, AW024686, AI522042, AI493860, AI075158, AI934344, AA962431, AI076565, AW294154, AI311802, AA582271, AA894912, AA873319, AI340924, H77532, AI632011, AA913289, T68855, AA344912, R92627, AA975849, AA923512, AI261211, T72069, AI274430, W85851, AW295240, AW449145, T58758, AA886200, C20969, T54622, AA677577, AW204090, AI431736, AI733070, AA886328, AA876291, AI733075, T61088, AA938341, AW300484, AI824065, AI763277, T68930, AC003034, AF062389, AF126145, AW511916, AW515489, and AW614210.
HLICR73	157	1107517	1 - 525	15 - 539	T69381, Z20524, AI765674, AW025169, AI565556, T72971, AL042852, and AF064255.
HNHOP64	158	1103943	1 - 1057	15 - 1071	AW291640, AL135367, AC006312, and AF055899.
HSDEF56	159	1128288	1 - 972	15 - 986	AA311582, T03269, D58283, D80166, D80195, D80193, D59927, D51423, D59619, D80210, D51799, D80391, D80240, D80253, D80227, D59859, D80043, D80212, D80196, D80188, D80219, D80269, D80038, C14429, D59889, D81030, D80366, D80022, AI905856, D59502, D59275, D50979, D57483, D80045, D59610, D80134, D50995, D80378, AW178893, D80024, D59787, C75259, D80241, D51097, C14014, D80164, AW177440, AW178775, C14331, C15076, D59467, D51060,

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HTENI29	160	1105518	1 - 1503	15 - 1517	AL041092, AI637690, AI680857, AI740628, AA868429, AI797114, W91992, AW235369, AI631483, AA700220, AI149964, AI802194, R60173, AA426087, N49244, AA421494, AA421463, AA679411, AA700001, AW196345, AI658711, AL041091, H78858, W91993, H12231, R60174, R22644, F07666, H12232, AI084952, T81757, AA843570, F03921, H48232, AL044279, H80102, F02043, R11534, AA701011, AW086177, M85939, T81502, AI081721, T97095, AI458652, AB020644, A86971, A86968, AF129166, A86970, A86965, AF099740,

					A86972, D10041, S56508, A87056, A86969, AC005217, A86966, AF102845, and A86967.
HWMKD72	161	1106729	1 - 1199	15 - 1213	AI832076, AW237392, AI492488, AI671332, AI653589, AA934764, AI186209, AI863485, H78628, N49567, AI625982, D12051, AI984413, F32232, AW299579, AI521141, AI473099, F34601, AW269310, F37206, AI342204, AI015555, AW445187, AI655530, AI337199, AW236573, AW004007, AL137715, AW611824, AW771245, and AW771974.
HAPSQ21	162	972037	1 - 851	15 - 865	T54068, AA359075, R11458, W19120, AI792425, AI129970, AA769575, AI924523, AW025398, Z25401, AA865691, AI271768, R18105, AR016588, AF098484, AF200345, AF090386, A70198, A70213, AF098485, AF200344, AF090387, A70212, A70208, A70207, A70206, A70205, A70210, A70202, A70200, A70204, A70201, A70203, and A70199.
HLJDW02	163	1192885	1 - 659	15 - 673	AI129970, AW025398, AI924523, AI679000, AI763426, AW268846, AI221418, AI806766, AI760722, AI382062, AI523866, AI832066, AI568939, AI191525, AI218262, AA744560, AI271768, AI732751, AW183525, AW169990, AA769575, AA651895, AI734145, AI147572, AA642140, AA486148, AA983960, AA648499, W19120, AI808932, AI094586, AI141016, AI056559, AA828295, AW444801, AI056557, AI217799, AA486087, AA972068, N45144, AA946631, AA279744, AA648280, N79802, AA830508, AI369218, AI245364, AA953132, D30983, AA203626, AA804495, AA865691, AI807188, AA970454, AA894808, AF090386, AF098484, AF200345, AR016588, AF098485, A70198, AF200344, AF090387, A70213, A70212, A70209, A70210, and A70200.
HMGBT01	164	1205666	1 - 5911	15 - 5925	AF150387, AI653425, AI005033, AI692559, N31914, AI962190, AW383588, AI769238, AI654166, AW188218, AW006416, AI632945, AI672507, AA908788, AI953133, AA922033, AI688071, AI692756, AI027143, AI609790, AI760187, AI123804, AI913960, AA908787, AI276907, N41658, AA701598, AI967995, N91120, N29007, AI379548, AA253253, AW086447, AI051280, AI692767, AI911581, AI634776, AI810313, AI095556, AI127822, AW015855, AI361393, AI199400, AI630762, N20635, AI094243, AI239472, AI253031, AI690614,

					AA099206, AI857994, AA282999, AI830072, AA677847, AA928329, AI248727, AI910447, AW027907, N67014, AI339231, R55298, AI292335, AA973564, H15683, AW207715, AI624463, AA448660, H24093, AI040388, AI784615, AI419567, AI374818, AI160390, AI436314, R39439, AA253083, AI343441, N95768, AI041665, AA136368, AA954460, T16305, W03585, AA256913, AW069659, AI081812, AA324296, AA738306, T08924, T61851, AI184285, AI040286, R99766, AA046100, W24881, Z43398, R54499, AA682676, T88844, H72735, H15682, AW016716, AI874047, R55398, AA015899, AW069573, H48909, AA255489, AA213582, H43536, T09492, AA705405, Z39584, AI283626, F10602, AI308238, R59459, T31012, AI371450, AI356651, N67783, Z40730, AI669838, H14539, R12815, T15416, F13007, N67536, Z44997, AI684849, AA015900, N64823, W19698, F12164, R01229, T77182, AA723830, Z41972, H14538, T75407, AA970909, H72736, N57556, R45449, R59399, AA861305, W78750, T31527, AA207232, T31207, H48910, AW173775, AA213470, AI696048, T09493, F10964, AA918558, R14536, H20326, AI419576, R98988, AI654890, T82253, F02791, Z41879, AA136283, AW418881, R32713, R10094, W86081, Z42912, R32714, F01374, F02384, H19939, T89769, R54400, R39272, Z39127, W20500, N42699, AA864263, R31458, AW379778, R20727, AA063085, F09798, N75675, R12478, H22915, R10194, R09874, R24715, Z42680, AI363357, W80488, F13372, AA678175, R41197, AA063135, T83530, N89954, R01343, F01493, AA758721, Z43512, H51212, AA665039, T65256, AA448756, R51553, F08640, AA045995, R51552, T72699, H60273, AA703165, AA249617, AI914223, AI700590, R31457, AI268856, AI214600, N83162, AI300027, T72629, AA249730, AA706090, AI299415, AI557082, D51002, D59751, D50992, AF201468, AB032975, AF200193, AF190725, AF200343, AF204943, AF190727, AF190726, AF200346, AF161367, A62300, T15417, AI127789, and AW770546.
HSSJJ24	165	1178041	1 - 2545	15 - 2559	AF150387, AI005033, AA701598, AW015855, AI095556, AI127822, AI094243, AI857994, AA677847, AI248727, R55298, AI040388, AA136368, AI081812, H15682, R55398, AI874047, AA705405, AI308238, AI669838, F13007,

					AA723830, AA970909, H14538, AA207232, T75407, T08924, AA918558, Z41879, AA136283, AW418881, R12478, AA063085, R12815, R09874, T89769, AA063135, AA758721, H51212, AA665039, AA249617, H60273, AA703165, AI914223, AI700590, AI268856, N83162, AI214600, AI300027, T09493, Z43512, AA249730, AA706090, AI299415, AF200343, AF201468, AF190725, AF200193, AF204943, AF190727, AF190726, AF200346, AB032975, and AF161367.
HFTCG46	166	669383	1 - 446	15 - 460	AA418122, AA071341, AA418034, AI081559, AA206778, AA463885, AI632139, and AB021660.
HNTMD81	167	929511	1 - 547	15 - 561	AI800075, N88280, N35665, AA418208, AI686505, H97489, R07706, H60753, AW023374, AA418073, AW027850, N67776, AI168759, AA620395, AA700811, N36146, AB025904, AL365403, AL365403, AL138795, and AL138795.
HBSAJ60	168	1174334	1 - 3412	15 - 3426	AA113322, D79592, AA113421, D62407, D62416, AA113364, D79529, D79548, D79554, and D79578.
HSKCI43	169	506599	1 - 336	15 - 350	AC068494.
HSDKE47	170	1128095	1 - 339	15 - 353	AA524812, AA551149, AI052375, N84879, AW242155, AI671023, AW103996, AI590357, AA316405, AW007038, AI818254, AI246543, T61234, H08133, AF114111, AW069305, AI937929, W22960, AF013160, AF050640, and X14338.
HCWTB56	171	1172460	1 - 475	15 - 489	
HFPBS73	172	1144027	1 - 1461	15 - 1475	AA027758, AA585439, AL039924, AL045794, T24112, T24119, AW013814, AI525556, T02921, AI541510, Z28355, AI546855, H00069, AL039150, D51250, C15189, AL040992, AL039109, AL038531, AL037726, AL039629, AL039625, AL039648, AL038837, AL039074, AL039678, AL039108, AL039538, AL039564, AL039156, AL038821, AL039659, AL039566, AL039509, AL043445, AA585101, AI541374, AI525316, AL039128, AL044407, AL036973, AL036725, AL045337, AL037051, AL045353, AL039386, AL039423, AL045341, AL042909, AL039410, D80253, AL043441, AL038025, D80043, AL044530, AI526180, AL043422, D59787, AI526194, Z30131, D80219, AI541523, D59275, AI556967, AL043423, D80227, T23947, C16300, AA585453, AI546999, AI525431, AI541017, D80240, AI546828, AI541534, AI540967, AI526140, AI541509, AW451070, T11028, AI525306, AI535983,

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HOEDD44	173	954893	1 - 742	15 - 756	AA027758, AI526037, and C16284.
HSUAN33	174	956315	1 - 1745	15 - 1759	AI693488, AA523696, AW082970, AA847735, AA504846, AI525023, and

					AA331650.
HBCMD49	175	1206021	1 - 907	15 - 921	AI190179, AA632398, AI452983, AA436085, AA974047, AA746327, AA856609, AA379426, AA954235, AI015697, AA435985, AA379438, AI561289, F17297, and T53860.
HKABN12	176	956826	1 - 886	15 - 900	AI190179, AA632398, AI452983, AA436085, AA974047, AA746327, AA856609, AA379426, AA954235, AI015697, AA435985, AA379438, AI561289, F17297, AI567961, AI440236, AI590043, AI355779, AI581033, AI866465, AW151136, AI866469, AI539771, AI537677, AI494201, AW151974, AI500659, AI539260, AI815232, AI801325, AI500523, AI538850, AI582932, AI923989, AI284517, AI872423, AI500706, AI491776, AI445237, AW151138, AI889189, AI521560, AI500662, AI284509, AW172723, AI889168, AI440263, AI866573, AI633493, AI434256, AI805769, AI434242, AI888661, AI284513, AI888118, AI859991, AI436429, AI889147, AI371228, AI440252, AI866786, AI539800, AI860003, AI610557, AI242736, AI887499, AI539781, AI559957, AI926593, AI582910, AI554821, AI440260, AI537187, AI432570, AI815233, AI648567, AI698391, AI687944, AI539632, AI433157, AI521571, AI355126, AI890907, AI539707, AW085373, AW023351, AI582912, AI801286, AI371251, AI358271, AI866510, AI538885, AW079432, AI567953, AI582926, AI923046, AL045626, AI887775, AI559976, AL047422, AI500714, AI432644, AI491710, AI205869, AI613314, AI804505, AI828574, AL036705, AW151132, AW089557, AI289791, AL042686, AI927233, AL039390, AI866691, AI285439, AW162194, AI623736, AI431307, AI440238, AI285417, AI567971, AI815239, AI431316, AL079960, AW151979, AI431238, AI702065, AI885949, AI285419, AI521589, AI469775, AI866581, AW074057, AI815150, AL045166, AI446495, AI866458, AI867068, AI225248, AI436438, AI698352, AI866503, AI623302, AI270429, AI274759, AW058275, AI952433, AI889191, AL047344, AI433976, AW194509, AI432666, AI627714, AI371229, AI888022, AI955221,

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HMOAC31	177	1228291	1 - 2627	15 - 2641	C16297, D62438, and D79589.
HMVBQ92	178	1204710	1 - 2399	15 - 2413	AW027617, AW167655, AI761852, AA632135, AW273477, AW188958, AW025350, W91943, AI248475, AW071025, AA443956, AA586906, AA411210, AA974499, AA748561, AA574049, AA633212, AA993212, AA444135, AW294610, AA405832, AA418055, T65000, AA417996, AA716696, AA422102, N29931, AA705781, AW338423, AI951713, AI623473, AW193961, AW269824, AI591113, W74344, N39885, AI476814, AI452555, W95062, N58311, AI707848, AA434443, AA504192, AI284330, AW071570, AA833607, N26927, AA993753, N27730, N27744, H48786, AA814543, H69589, H91115, AI050821, R59175, H91466, AA723025, AA708478, AA412129, T53881, N80150, R59231, AA325056, AA805411, H86410, H86073, AW265431, AW080735, AA719996, H48787, AA327279, AW439101, R72184, AI041429, AW439110, AA932990, AA290758, H68481, AA290757, AI301278,

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HOELA62	179	1228151	1 - 2120	15 - 2134	W91943, AA444135, AA422102, AW027617, AW167655, N39885, H48786, AI761852, H91115, R59231, AA325056, AW273477, H86410, AA632135, AW265431, AW188958, AW025350, AW352186, W21241, AA290757, AW366339, AI248475, AW071025, R70407, W03678, H75371, T50944, AA443956, AA586906, AA411210, AA974499, AA412129, AA574049, AA748561, AA993212, AA405831, AI951713, AA419235, T65000, AA418055, AA405832, AA633212, AA417996, AA716696, AW338423, AW294610, AA705781, AW193961, C05231, AW269824, AI623473, W74344, AA434443, AI476814, AI707848, AW071570, AI452555, AI591113, R72230, T71152, AI284330, W95062, AA336401, AA993753, AA833607, AA814543, N29931, H69589, N26927, H91466, N27730, AI050821, R59175, AA805411, AA708478, AA723025, N58311, AA504192, T53881, AA342345, N80150, AA327279, N27744, AA719996, AA419337, AW439101, F37718, AW439110, H86073, AI041429, AA932990, AA317298, AA290758, R72184, AW080735, and AI301278.
HSSGE35	180	1228152	1 - 1116	15 - 1130	AW027617, AI761852, AW167655, AA632135, AW273477, AW025350, AW188958, AI248475, AW071025, AA443956, AA974499, AA586906, AA411210, AA748561, AA574049, AA993212, AA405832, AA418055, T65000, AA633212, AA417996, AA716696, AW338423, AW269824, AI951713, AW294610, AA705781, N29931, AW193961, AA928847, AI623473, W74344, N58311, AA434443, W95062, AI452555, AI476814, AI707848, AI591113, AW071570, AA504192, AI284330, AA993753, AA814543, AI298655, AA833607, R59175, H69589, N27730, N27744, AI050821, H91466, N26927, T53881, AA723025, AA412129,

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HEMFJ74	181	1216651	1 - 1774	15 - 1788	AW294538, W23746, AI078278, AA293414, C14389, AA305409, AW369384, AA305578, D59859, D59619, D80210, D80240, D80188, D51799, D80166, D51423, D80253, D81030, D58283, D59275, D80219, D80212, D80022, C14331, D80195, D80043, D59467, D80391, D80164, D59787, D80227, D59502, D57483, D59610, D80366, D80248, D80024, D59889, D80196, C15076, D59927, D80269, D80038, D50979, D51022, D80193, D50995, D80241, AA514186, D81026, D80378, AW177440, D51060, AA514188, C14429, AW178893, D80251, D80045, D80522, D80133, T03269, C14014, C75259, AW360811, AW179328, D80268, C05695, AW378532, D80439, AW375405, AW177501, AW177511, AW377671, AW360844, D80247, AW178762, AW366296, AW360817, D51250, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, D80134, AW178906, D80302, AW178775, D80132, D58253, AW352158, D59373, AW352117, AW176467, AW352171, AW377676, AW369651, AW352170, AW177731, AW178907, D51759, AW179019, AW179024, D80157, D51103, AW177505, AW360841, AW179020, AW178909, AI910186, AW177456, AW179329, D52291, F13647, AW178980, AW177733, AW378528, AW178908, AW178754, AW179018, D80949, D58246, AW179004, D80168, AW179012, AI905856, D81111, C14298, AW178914, AW179009, D51079, AW378525, T11417, C14227, D80064, T48593, AW177722, D59653, C06015, AW367967, AW352174, AW360834, AW178983, C14407,

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HISCL24	182	676997	1 - 574	15 - 588	AW294538, W23746, AI078278, E15871, E15865, E15866, AB016789, and AB016780.
H7PBB83	183	1228150	1 - 1350	15 - 1364	AI866480, AI983534, AI274967, AI333019, AW303755, AW452025, N31757, N31555, AA496999, AA161418, AL040482, AA630664, N39479, AA648068, AI114875, T68311, T51330, H95917, AA648602, AA308992, F37190, AA403243, AA830558, AA262117, N98795, AA186599, F28863, N57116, AA595742, AI913895, AC007450, L39119, Y11107, D44443, AR038762, AJ005168, AJ245869, U67221, AF054142, and AF019721.
HAGBA63	184	1122199	1 - 1108	15 - 1122	AI674718, AI685739, AW162539, AI968464, AI636234, AI380384, AI949139, AW190860, AA600836,

					AI476539, AI218004, AA046407, AA837397, AI190723, AW445018, AI696086, AI253152, AI280816, AA910260, AI270119, AI336795, AI393433, AA654266, H49124, AI383818, AI800287, AI628214, H50384, AA878814, H88208, AI630586, H40173, H40108, R41323, AA379177, H88209, AA056167, AA903289, AI301246, and AF042169.
HBMUG47	185	1102698	1 - 1051	15 - 1065	AI684041, AA155835, AI567000, AI671940, AA155882, AI686448, AI310229, AW380706, AW380712, AW368882, AW379646, AW380705, AI218469, AI363275, AW379653, AW379647, AF135183, and AB006533.
HCRPZ84	186	1130816	1 - 1953	15 - 1967	Z20545, AA099688, AI718277, AI535926, AI806204, AI922705, AW189584, Z20083, AA134958, AW152541, AC007750, I50897, A74554, and A74468.
HCWTR54	187	1192287	1 - 370	15 - 384	AI302350, AW275432, AI249688, AA458534, AA593471, AA610255, AW167154, AI002261, AI590476, T94116, AA569202, AI598003, AI832865, F36273, AA516207, AA664604, AA347927, AA579278, AA548029, AW166611, AL039187, AA346586, AI962050, AA508809, AA347930, AI284640, AI340832, AW021917, AI014378, AI863399, AA627154, AA728937, H96518, AA347114, AI244356, AA843450, AI305258, AI859280, AA167741, AA350859, AL133950, AA574353, AA862243, AI613465, AA804925, AA527209, AW238495, AW274182, AI038304, AI581486, AA515631, AI679413, AI282832, AA574442, AI623805, AL041706, AW020198, AA488620, AI653515, AI683079, AI754567, AC005844, M87914, AL117337, AP000512, AF205588, S42653, AC006064, AC005746, AC000353, AC005531, AC003041, AC004895, AF042090, AC008119, Z84469, AC007225, AC006512, AC005755, AL008635, Z84467, AC007226, AC005251, AP000248, AL034418, AL021937, AC005089, AF124523, AC000075, AB020863, AC003101, I34294, AC007388, AC003030, AC005332, AC005971, AL122003, AC005914, AC005288, AP000402, AC004797, AC005519, AC004685, AL034417, AC000026, AC005740, AC007551, AC006449, U47924, AL033376, AC004883, AC005409, AC002059, AC005907, AC002470, AC004019, AC007686, AC004686, AL049780, AL022476, AC005512, AC005200, AC005664, AL031597,

					AC005011, AL034548, AC000015, AC005722, AC003668, AL035089, AP000210, AP000132, AC003688, AC007011, Z98200, AC004531, AC009516, AF045555, AP000120, AP000167, AP000052, AC006597, D84394, AC006547, Z83840, AL031315, AP000961, AC005920, AC002094, AL096701, Z68756, AF029308, AP000009, AC004849, AL031431, AC002504, AF053356, AC008372, AF141309, AC007546, AC007207, AC005829, AL136295, AC004841, AC007450, AJ003147, AC007204, AC002477, AC000041, AL049872, AC006121, AP000553, AC008040, AC004234, AC007055, AP000703, AC004072, AP000500, AL008629, AC006050, U02068, AC004854, AC005697, AP000505, Z98749, I51997, Z69917, AC004687, AL031846, AP000349, AL035683, U96629, AC006442, AF196779, AL109984, AC009498, AC004983, AC010582, AC006160, AL035455, AL049869, AC000082, AL031078, U50871, AL050318, AC007390, AC005919, AP000116, AL034420, Z95152, AC004079, AL109799, Z84487, AP000114, AP000046, AC006530, AL024498, AL035542, AL133353, AC005037, AL022316, AC002394, AC004409, AC004922, AP000134, AP000212, AC005940, AC004383, AC002551, AC007666, AL079295, AC005368, AC005412, AL035681, AL117354, AC005399, AP000466, AB016897, AL021807, D87675, AL021394, AL121595, AC003964, AC005184, AC008134, AL021578, AC004913, AC006468, AC007227, AP000150, AL020997, AL035587, AC002418, AP000502, AF134726, AC005274, AC004816, AC005484, AC006312, AC004150, AC004905, AC004859, AC004821, AC006249, AC004858, AC006241, AC008125, AC006581, Z82206, AC007021, AP000031, Z99128, U73023, AC005230, AL049697, AB026899, AC005261, AP000252, AC007406, AC006101, AL031121, AC004477, AL022320, AC005899, AL008719, AC005207, AL034555, AP000962, AL031311, AC005498, AC002299, AC000120, AC005071, AC004386, AC007934, AC002319, AP000350, and AC006388.
HDPBB41	188	1195686	1 - 2874	15 - 2888	AA629318, AI760806, AA206978, AL043066, AW166212, AA425460,

					AI917308, AI056245, AL048641, AA586628, AI692709, AI831911, AA425277, AA405884, AI799931, AI767009, AI244624, AA693749, AI630165, AI373907, AI864959, AA653268, AW271989, AI474047, AA653267, AW450325, C21113, AI470797, AA405193, AA256993, AW403223, AI568903, C06086, AI431951, AW377675, AA313069, T95499, AA776533, AA256994, AA355278, AI758787, H89698, AW365130, AA374679, AW362584, AA356553, T95500, AI630633, AA233991, AI673443, AW391367, AA236033, AA653160, AB018344, AF106680, U25746, AC005372, AC001048, AC001527, AC001049, AC001047, AW516386, AW589717, and AW770130.
HEOPI32	189	907903	1 - 658	15 - 672	
HFSAG03	190	1151479	1 - 1095	15 - 1109	AI608909, AA652060, AA342084, AI298660, AC009247, AC003101, Z73359, AC000379, AC005670, U91318, AC007021, AP000557, AL049776, AC005919, AC002312, AL031602, AC009516, AB020865, AC005531, AC007151, AC007637, AP000109, AP000041, AL050318, AC007314, and AL133245.
HFXCI24	191	1182719	1 - 667	15 - 681	
HFXHJ89	192	907938	1 - 950	15 - 964	AA772229, AI032872, and AL031667.
HHPTC55	193	1106390	1 - 663	15 - 677	AL134779, AW403151, AB018352, and AW594431.
HJBBP54	194	1195070	1 - 563	15 - 577	AA356633, and AL023803.
HKAHB56	195	1162649	1 - 1964	15 - 1978	AI583960, AI952045, AA151667, AI983595, AA843917, AA026663, AW166428, AI308225, W44522, AI809227, AI277831, AW297288, AA464999, AA399149, AA455279, AA010423, W44521, AI128699, AA010395, AA608908, AI905004, AA639536, AA371294, AI648709, AA026711, AI207083, AI905003, and AC003104.
HLDCI35	196	1151490	1 - 773	15 - 787	AI760643, T78476, AI913746, N74639, AW450191, AI672811, R99475, AW444631, T71577, N58369, T40936, T91004, T78557, R99474, R28738, R93411, T81723, T84581, AW300983, T82031, and AF209192.
HMCBU79	197	1165318	1 - 1047	15 - 1061	AA976002, AA613500, AA873354, AI701066, AI802911, AI598264, AI803092, AI337726, AW374991, AW375000, AA620998, N47591, AW176570, T96959, AA889162, AW449691, AI401363, N45464, AI015106, T08650, T91835, AA970196, AA810602, AA384574, AI672896, AA905988,

					AI827760, AI797084, AA320491, AI127411, AI817660, AI004566, C02558, AA810594, AA703440, AI497709, AI435494, AI702289, AA460950, AI940414, T97071, T91922, T07472, AL122076, AF082179, AF173643, and AF088884.
HNTRV07	198	1199546	1 - 2378	15 - 2392	AW027788, AW003101, AW291430, AW029391, AI274820, AI809706, AI916375, AA640185, AI916363, AI146505, AI884408, AI277493, N26244, AA609635, AI655416, Z43702, AW051663, D60919, AI289588, Z39761, AA758072, and AA598992.
HODEX10	199	1104108	1 - 479	15 - 493	
HOGAQ10	200	1222600	1 - 2476	15 - 2490	AI653115, AI281473, AI377912, AA815186, AI280027, AA491250, AA197295, W24286, N95450, AI825293, AA832432, AA628231, W25169, N93682, D59275, C14389, D80164, D80195, D59467, D80227, D59502, D58283, D50979, D59859, D80022, D80166, D80043, C15076, D51423, D59619, C14331, D80210, D51799, D80391, D80240, D80253, D59787, D81030, D80269, D59610, D80038, D80193, D80188, D80212, D80196, AA305409, D80219, D59927, D57483, D80378, D80366, AA305578, D59889, D50995, D80241, D80045, D80024, T03269, C14429, D80251, D51060, AW178893, AW177440, D51022, C75259, AA514188, D81026, C14014, D80248, AW179328, AW378532, D51250, D80522, AW178775, AW179332, AW360811, AA514186, D80133, D80134, D52291, AW369651, AW375405, AW178762, AW352158, D58253, AW177501, AW177511, AW178906, AW179329, AW377671, F13647, D59695, AW366296, C05695, AW360844, AW360817, D80268, AW352117, D80439, AW375406, D80247, AW378534, AW377672, AW179023, AW178905, AW177731, AI910186, D80302, D80168, AW176467, D58246, AW179020, D51103, D80132, C14227, AW352171, AW179004, AW377676, AW352170, AI905856, AW178907, AW178908, AW179019, AW179024, D81111, AW360834, C14298, D80064, AW177722, D59373, AW177505, AW360841, D80157, AW378540, AW178909, AW177456, C14407, AW178980, AW177733, AW378528, AW178754, D51759, AW179018, AW179009, AW179012, AW178914, AW178911, AW378525, Z21582, C06015, T48593, T11417, AW178983, D51097,

					AW178774, AW378543, AW177728, AW352163, AW367967, D59653, AI557751, D59503, AW178986, D45260, AW178781, AW352174, AW177723, AA809122, D59317, AW352120, AW367950, H67854, D80258, C03092, AI535850, AI525923, H67866, AI557774, D58101, D59627, T03116, AW177734, AI525917, AW378533, D80014, AI535686, C14973, C14344, D51221, AI525227, D59474, D59551, D51213, D60010, AI525920, U25691, AJ132110, A84916, A62300, A62298, AR018138, A67220, AB028859, AR008278, AF058696, X67155, Y17188, D26022, A25909, D89785, A78862, D34614, D88547, Y12724, X82626, A82595, I82448, AR060385, AR025207, AB002449, A94995, I50126, I50132, I50128, I50133, AR008443, AR016808, AR066488, AR016514, AR060138, A45456, AB012117, A26615, AR052274, Y09669, A43192, A43190, AR038669, AR066487, I14842, A30438, A85396, AR066482, A44171, X68127, A85477, AR054175, I19525, A86792, D50010, Y17187, X93549, A63261, X64588, AR008277, AR008281, AR008408, AR066490, AR062872, A70867, I18367, AR016691, AR016690, U46128, I79511, D88507, D13509, AR060133, A64136, A68321, AF123263, AR032065, AR060382, AR008382, X93535, and AW664301.
HOSBW20	201	985056	1 - 913	15 - 927	H08004, R24580, AA291098, Z42372, and AA625285.
HRADL60	202	1151310	1 - 2818	15 - 2832	AW384788, AI675355, AA744751, AA744748, AA845503, AW043626, AW299842, AI452733, AI366887, AI034444, AI040175, AA521456, AI332420, AI039015, AI016103, AI692961, AW052078, AI651418, AI690586, AI091379, AI377503, AI084606, AW028307, AI625000, AI039629, AI167271, AA281485, AI658975, AI916884, AI418865, AI742911, AW086446, AI479568, AI692998, AA426143, N28524, AA160283, T27255, AA825823, AI204190, AA160282, AW384791, AA505179, AA410336, AI963863, AA424923, AA406093, AI890952, AI693422, AA425608, AI240433, AW080190, AI540568, AI373898, AI948971, AI269392, AI753161, AW021363, AA304886, AI760067, AA806472, AA846492, AI183665, N66960, AA099378, AL038540, AW449066, AL038539, AA662805, AA364218, AI061210, C03020, AA628116,

					AA451957, AI362354, AI022892, AA463745, AA824252, AA099702, AA811719, AI472811, R97738, AI923603, AA811568, AA992984, AW135728, AI088053, AA897107, R96808, T34664, R86031, H56147, AA009984, R74232, R75933, AI270739, AI942304, AA281712, AA304597, AW170438, AA827323, AI699077, AI188894, R74233, H72118, AA405783, AI811853, AA009985, H72221, AI288189, AI863806, AW198063, H99845, AA299273, AA443927, AA480301, R30666, R85985, AA444106, AA455561, AA405718, AA740762, AC005702, AC004167, AW511602, AW516414, AW627782, and AW631098.
HSGSC29	203	1150837	1 - 865	15 - 879	AI953659, AI050796, AW140027, AA478726, AI283360, AI608921, AA700713, AA700770, AA479430, AI927858, R44554, C01756, W86092, and AL036771.
HTEDX38	204	1106208	1 - 1871	15 - 1885	AL044363, AA447302, AI634406, AW000894, AW401349, AW236978, AI467963, AW055309, AW014521, AI362163, AI191474, AI277716, AI963837, AI092327, AI191249, AA434020, AI339113, AA437386, AI831293, AI221256, AA747576, AA461593, AA250939, AI024342, AI828851, AA306239, AI091758, AI913089, AW016713, AA460305, AI203023, AA742597, AI371510, AW388368, AA303940, AA860160, AA250963, AA731204, AI913691, AF106019, AF171063, AL133598, AL049557, and AL022098.
HTEJE15	205	1102531	1 - 663	15 - 677	AI217144, AA399611, AA398976, AI025074, AA758412, AW449170, AI953070, AI337133, AI654417, AA608877, AI969018, AA400066, AA401568, AL137462, S75275, and D14859.
HTOES03	206	1150877	1 - 1173	15 - 1187	AI816756, AI741299, AI804293, AW452955, AA455255, AA885819, AI799017, AA837172, AA836405, AI274017, AA748579, AA668887, AI439057, AA731850, AA720637, AA862905, AI263559, AI084245, AI380616, AW293212, AW024488, AW027530, AA934381, AW378865, and AA741276.
HTOHS18	207	1193057	1 - 1653	15 - 1667	AA570331, AA099587, AI248685, AA099648, AI445434, AI701243, AA424948, AW337329, AA688394, AI288907, AA234304, AI311769, AA234394, AA327735, AA424873, AW261878, AA424749, AA424947, AI474220, AI272273, and Y16709.

HWAAX38	208	943936	1 - 1302	15 - 1316	AA258959, AA255426, N30506, W03086, AA255592, AA296423, W24603, AA249056, AI968991, C04062, AI735341, and AA805676.
HMSFN70	209	1210794	1 - 2788	15 - 2802	AI302253, AI681108, AA401235, AI126248, AI656239, AA918740, AI937425, AI741021, AA843517, AI500172, AI421803, AW007340, AA451624, AI569817, AW026832, AW390547, AA404277, N50110, AI092263, AA766293, AA291461, AI341759, AA284449, AA450220, AI097356, AI911900, AI818988, AI082624, AW137544, AW044424, AA235465, AA292529, AI057584, AA843791, AA127047, H45298, N75571, AA912550, AA992665, AI225107, AI244651, R71076, AW370933, R81819, AA045627, AA688282, AA045626, AI564927, W05555, AA287017, AI783626, AA976903, W48565, AA429567, W48566, H53366, H27854, AA769010, AW378050, AA329369, AI282052, AW150712, AW149953, H45374, H53418, AI952616, AI871241, AA125789, AI457989, AW389252, C05676, AI971909, AI369550, AA594405, AI127975, AW473702, AW594229, and AW772388.
HUSGB93	210	1224029	1 - 971	15 - 985	AW406527, H97426, AA643182, AW276894, W44834, AI806904, AI128324, AA809131, AA832235, R57989, AA830032, AF125042, AJ249339, and AJ000347.
HELHL56	211	1164004	1 - 1767	15 - 1781	AL134932, AI424948, AA278217, AI624314, AA160640, M78353, AI084686, R21778, AA760801, AA300647, AW362782, AA278663, and AA994437.
HOENY85	212	1191756	1 - 1532	15 - 1546	AA160640, AA278217, AL134932, R21778, AA300647, and AA994437.
HTEHI14	213	1102680	1 - 535	15 - 549	AI656480, D59502, D80195, D51799, C14389, D80164, D80038, D59467, C15076, D59275, D80227, D80269, D80022, D80166, D58283, D80378, D80193, D59619, D59859, D80210, D80391, D80240, C14331, D59787, D51423, D80253, D80043, D81030, D81026, AA305578, D80212, D80196, D80248, D50979, D80219, D80366, AA514188, D80188, D59927, AA305409, D57483, D80241, D59610, D51022, D50995, D59889, D80045, D80024, D80133, AW177440, D80522, T03269, AW178893, D51060, C14429, AW360811, AA514186, C14014, D80251, AW377671, AW179328, D80302, AW375405, D80439, C75259, D80247, AW378532, D80268, AW177501, AW177511, AW366296, AW360844, AW360817, AW375406,

					AW378534, AW179332, C05695, AW377672, AW179023, AW178905, A84916, AJ132110, A62300, A62298, AR018138, AR008278, AF058696, AB028859, A82595, Y12724, AR060385, X67155, Y17188, D26022, A25909, AB002449, A67220, D89785, A78862, D34614, D88547, A94995, AR008443, I50126, I50132, I50128, I50133, X82626, AR066488, AR060138, I82448, AR016514, A45456, A26615, AR052274, AR016808, I14842, AR025207, Y09669, A43192, A43190, AR038669, AR066487, AR054175, A30438, Y17187, A63261, D50010, AR008277, AR008281, AR062872, A70867, I18367, AR008408, AR016691, AR016690, U46128, AB012117, A64136, A68321, I79511, AR060133, D13509, X68127, AF123263, and AR032065.
HETDT70	214	1228235	1 - 586	15 - 600	AA156832, T96213, AA299371, AA321353, AI810397, E16580, AF035268, AF035269, and U37591.
HPIAT34	215	936262	1 - 562	15 - 576	AA156832, AI810397, AA299371, T96213, U37591, E16580, AF035268, and AF035269.
HDPPO41	216	1204324	1 - 3071	15 - 3085	AI139882, AW372581, AA442710, AA877904, AW372587, AI770174, AI539441, AA625121, AA490194, AI633309, AI361039, AA773718, AI336242, AA913955, AW082708, AL044683, AA625245, AW372585, AA127749, AW015838, AI684313, AI962383, R25792, AI951420, AI432514, AI435855, AA229604, AI423475, AA233020, AI431531, T70290, AA804544, H29402, AA826095, T87869, H11826, H07001, AA082620, AA156095, AA229914, T17472, H19387, AI287493, T66752, AI094976, C04205, AA337227, T66751, T87958, AA235237, AA101130, AI027567, T17473, AI243842, AI568315, H15839, AA853458, T28950, R12843, H11749, AW269644, AA783031, AI654882, AI690921, AI378497, AA934605, AA853459, T79599, H68911, AI218090, T79683, AA496055, C03988, R46791, AA887922, AW169886, AI869101, AI586994, AA994515, T95521, R20752, AA332592, AA229696, T25984, AA156521, AI370468, H16148, AA883256, T80865, AI359674, AA844103, AA771780, M55905, AF116275, AF116274, AI684161, and AW589736.
HMSHI83	217	1204709	1 - 2376	15 - 2390	AA442710, AW372581, AA877904, AW372587, AI770174, AI539441, AA625121, AA490194, AI633309, AI361039, AA773718, AA913955,

					AI336242, AW082708, AL044683, AA625245, AW372585, AA127749, AW015838, AI962383, R25792, AI435855, AA229604, AI423475, AA233020, AI431531, T70290, H29402, AI684313, AI951420, AI432514, H11826, H07001, AA229914, H19387, AA804544, T66752, AI287493, AA826095, AI094976, C04205, T87869, AA337227, T87958, AA156095, AA235237, T17472, AI027567, T17473, AI568315, AI243842, AA082620, H15839, AA853458, T66751, H11749, T28950, R12843, AA101130, AW269644, AA783031, AI654882, AI690921, AI378497, AA934605, AI218090, T79683, AA496055, C03988, AA887922, AW169886, AI869101, AA994515, T95521, T79599, H68911, T25984, R46791, AI586994, H16148, R20752, AA229696, AA883256, AA853459, AI370468, AA156521, AI139882, T80865, AA332592, AI359674, AA844103, M55905, and AF116275.
HTEPM45	218	952389	1 - 1430	15 - 1444	AA442710, AA490194, AA625121, AA773718, AA625245, R25792, AA229604, AA233020, T70290, H29402, AW372581, AW372587, H07001, AA229914, T66752, C04205, T87958, AW372585, AA235237, T17473, T28950, R12843, AI770174, H11826, AA877904, T79683, AA337227, H19387, C03988, AI539441, AW082708, AI361039, AL044683, AI336242, AA913955, T95521, AA127749, AI962383, H16148, AI435855, T80865, AI633309, AI094976, and M55905.
HE8OV13	219	1228507	1 - 1894	15 - 1908	AW361145, AA159854, AW385193, AI905632, W20422, AW371259, Z43294, AA161059, R17090, R07447, AA007287, N54761, AA403066, AA161002, AA416825, R62201, F07754, F02724, W31874, Z40838, AA004273, and AL133017.
HELGU27	220	1011928	1 - 823	15 - 837	AA853506, AW374728, AB018270, and X81597.
HHEDC90	221	1226157	1 - 3386	15 - 3400	AI693688, AI089291, AI492178, AI239859, AA932955, AA651942, AI057017, AW205176, AA806301, AI911826, AW205734, AI439640, AI379127, AI493662, AW207182, AW270056, AW340433, AA825776, AA824566, AI239585, AA310652, AA256500, AA235097, AA291012, H58752, AA078664, D31147, D31363, D31268, AA911804, AA256924, AI243382, AA578487, AA504191, AA504190, AL119457, AL119324, AL042544, AL119399, AL134524, AL119484,

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HNBRB59	222	685902	1 - 400	15 - 414	AA640104, Z82215, M69180, and M81105.
HNNBI16	223	965414	1 - 338	15 - 352	AW392670, AL119443, AW363220, AW384394, AW372827, AL119483, AL119319, AL119497, U46347, AL119457, U46350, U46351, U46349, AL119324, Z99396, AL119484, AL119363, AL119391, AL119444, AL119355, U46346, U46341, AL119341, AL119335, AL119399, AL119396, AL134533, AL119439, AL119522, AL134518, AL037205, U46345, AL119496, AL119418, AL042542, AL134527, AL042614, AL134538, AL042970, AL042965, AL134532, AL042450, AL042975, AL042544, AL043019, AL042995, AL042984, AL043029, AL119488, AL042551, AL043003, AL119464, X99638, U96723, U96726, AB026436, AR054110, A81671, AR069079, AR060234, and AR066494.
HUJCL61	224	1223496	1 - 3318	15 - 3332	AI693688, AI089291, AI492178, AI239859, AA932955, AA651942, AI057017, AW205176, AA806301, AI911826, AI439640, AW205734, AI379127, AI493662, AW340433, AW207182, AW270056, AA825776, AA824566, AI239585, AA310652, AA256500, AA235097, AA291012, H58752, AA078664, D31147, AA911804, D31363, D31268, AI243382, AW068842, AA504191, AA256924, AA504190, AA578487, AI863184, AA573896, AA595932, AI623201, AI679018, F34677, AW411320, X99638, U96723, U96726, and AF077051.
HWLRC68	225	1089187	1 - 1346	15 - 1360	Z99396, AW392670, AW372827, AL119484, AL119497, AW384394, AW363220, AL119443, U46341, AL119396, AL119457, AL119483, AL119319, AL119391, AL119335,

					AL119355, AL119324, AL119363, AL119341, AL134920, AL119444, AL119522, U46349, AL119418, U46351, AL119496, AL042965, AL119439, U46350, U46347, U46346, AL134524, AL134533, AL037205, AL134528, AL042896, AL134531, AL134532, AL119399, AI142132, U46345, AL134538, AL036924, AI142139, AL036767, AL037094, AL036196, AL037077, AL037082, AL036191, U55042, AJ249706, AF184153, A81671, AR066494, AR060234, AR054110, AB026436, and AR069079.
HFXFH42	226	1228147	1 - 994	15 - 1008	AW183170, AW058499, AI476139, AA938182, AA058593, AI362085, AA663645, AI379303, AI280062, Z39588, H83739, AI220755, R37678, AW016870, AA127866, R43565, AI783634, H83883, AI572222, AW015468, AI079104, AA127818, and AW206436.
HEQAN73	227	958912	1 - 1499	15 - 1513	AI979251, AI796919, AI741732, AI435416, AI805174, AI392824, AI889011, AW119231, AI949681, AA044214, AI341056, AW195863, AI803333, AA044084, AW104400, AI861829, AA503851, N64645, AI625405, AI376293, AA570142, AA830997, AA897774, AA748752, AI243362, AI302558, N80077, AI928246, AI566182, AI222093, AI913224, AI743535, F12040, AI709094, AI968331, AW197901, R60491, AW183301, R60483, R60484, R48952, AA365086, N63094, R34414, R60492, F09684, AA903744, and AC008012.
HSLFS31	228	1106294	1 - 594	15 - 608	
HELK56	229	1103702	1 - 625	15 - 639	D80132, D80134, D58253, AW367967, AW177440, AI905856, AW366296, AW178893, AW375405, AW377671, T03269, AW177501, AW177511, AW352117, C14389, AW179328, AW360811, AA305409, D58283, D59859, D80022, C14331, D80166, D80195, D80193, D59927, D59467, D51423, D59619, D80210, D51799, D80391, D80164, D59275, D80240, D80253, D80043, D59787, D80227, D59502, AW378532, D81030, D80248, D80269, D80212, D80366, D80196, D80188, D80219, D51097, AW360844, AW360817, AA305578, D80038, C15076, D59610, C14429, D57483, D51022, D50979, D50995, D81026, AW375406, AW378534, D59889, AW179332, AW178762, AW377672, AW179023, AW178905, D80522, AW352170, D80024, AW177731, AA514188, AW352158, AW177723, AW178983, D80378, AW178906,

					AW178775, D51060, D80133, AW179020, AW377676, C14014, AW352171, AW178980, AW178907, AW178908, D80045, AW179019, AW179024, D80251, AA514186, AW177505, AW178909, AW177456, AW179004, AW179329, AW178911, AW177733, AW378528, AW178754, C75368, AW179018, AW352174, D80268, AW176467, D80302, C75259, AI535850, AW178914, AW178774, AW179011, I18367, AR066490, Y12724, X82626, A84916, A67220, D89785, A62300, A62298, Y17188, A78862, D34614, D26022, D88547, AJ132110, AR018138, AR008278, X67155, AF058696, A25909, AR008443, AB012117, AR025207, AB028859, A94995, A85396, D13509, D88507, AR066482, A44171, A85477, I19525, A86792, X93549, and U79457.
HAMFW05	230	957586	1 - 1034	15 - 1048	AC005594, AC005594, and AC005594.
HTEDG81	231	1193054	1 - 1179	15 - 1193	AI190605, AW082323, AA356219, AI208433, AI648684, AI539153, AI521012, AW302965, AI921248, AL079963, AI571909, AL119863, AW162189, AL038445, AI872910, AL043975, AA640779, AI537677, AL045500, AW051258, AI619502, AI677796, AI632408, AI802542, AI922901, AI569583, AI886753, AI269862, AI273048, AW026882, AI620284, AI433157, AI702073, AI358701, AI627988, AL121014, AW268251, AI620639, AW161579, AW403717, AL036274, AI783504, AW268220, AI499285, AI446373, AL036403, AI254727, AI670009, AI343059, AA572758, AI309401, AL041772, AI349933, AA427700, AI590120, AA287231, AI554245, AL048656, AW238730, AL036901, AW148536, AI312428, AW074993, AI349614, AI569328, AI133489, AI343112, AI349937, AI340603, AI439717, AI815855, AI349598, AI497733, AL036631, AI284131, AW023590, AW088134, AI312152, AI345735, AI269205, AW075084, AA494167, AI468872, AI340519, AI859464, AL120853, AW105601, AW088903, AL036980, AI862144, AW081255, X61970, I48978, I89947, A08916, AL110225, AF113677, A08910, A08913, AL137557, I48979, A58524, A58523, E07108, X82434, AL133080, AL133640, AL096744, A08909, AF090903, Y16645, I89931, AL137459, AF146568, I49625, AF090896, AL133560, AL137527,

					AL117435, AL049430, AL133075, AL050149, AL117585, S78214, AB019565, AR011880, AL050108, AF113690, AF017437, AL117460, AF090900, AF104032, AF078844, AF113019, AL110196, AF017152, AF090901, AL050277, AF106862, AJ000937, AL117457, AL050116, AL133016, AF113694, AL122050, AL137550, AL133606, AL080124, U00763, AF090934, A77033, A77035, AL110221, AL133565, AL080060, AL049452, AF079765, AF091084, AF125948, L31396, AL050146, L31397, AL122123, AL137478, AL133557, Y11587, AL117583, AF113691, AF177401, AL122121, AL122110, AL049314, U42766, A03736, X63574, AR038969, E02349, AF113013, AF158248, AL050138, AL049466, AF090943, A65341, Y11254, AF111851, AJ238278, AF113676, AL122093, AL050393, AF162270, AF113699, AL049382, X84990, AL049464, AL117394, E03348, AF113689, AF118064, AL133093, AF118070, AR059958, AL122098, S68736, AL080137, A93016, I03321, AF118094, X70685, AJ242859, AF125949, AL117432, X72889, AL049938, I33392, Z82022, AF183393, Y09972, AL137538, AL122118, AL133072, X96540, AR038854, AL049300, I09360, AL137648, AF097996, Z72491, AL133113, E07361, AL049283, E02221, AJ006417, AL137476, AF111112, AL137271, AF079763, I09499, AF185576, AL050024, A08912, U35846, AR013797, AL137526, L30117, Y10655, I26207, AF126247, U91329, A93350, I00734, AJ012755, E08631, E00617, E00717, E00778, AL133077, A12297, Y07905, X98834, AL137463, AF087943, AR000496, U39656, AL110197, AL080127, U80742, X65873, AF008439, U72620, S61953, AL137283, L19437, AL080159, AF132676, AF061836, AF210052, AF026124, Y14314, AL117440, U78525, X93495, U49908, AF067790, AF119337, X87582, U67958, U58996, AF111849, X92070, U96683, A45787, AL133568, AF081197, AL080086, AL133104, AL133067, AL137556, E06743, I42402, AL050172, AF081195, I41145, AL137480, AL137560, AL137521, AL122049, E05822, AL133098, AL133014, E15569, AL137273, AL080074, AL137533, AF100931, AL122111, Z37987, AF057300, AF057299, X83508, AL110280, AF061943, AL137429, AF003737, AF067728, E04233, AF153205, A07647, and AF026816.
HAMGO24	232	943287	1 - 964	15 - 978	AA528169, AA877468, AA730240, and

					AL137348.
HMWBH91	233	1193044	1 - 1767	15 - 1781	AI131535, AA814807, AI828032, AW272219, AI139995, AA418678, AA521385, AI478439, AW051829, AA643133, AI476489, AI351672, AI272800, AI273642, AI650882, AI307118, N42421, N95005, AI093305, AI240039, AA242868, AA418690, AA724431, W01661, AA460397, AA917597, AI371335, AA479389, AA974690, AI985154, C17104, AI379324, AI918673, T24038, T24037, AA720622, R55123, AA757357, AI355016, N33448, AA460334, AA479291, AA496828, AA496871, R55171, AI475251, AA568574, AA243258, F13637, AL135071, T36250, AA883124, AA352697, and AW050395.
HOECH19	234	965639	1 - 1128	15 - 1142	W30719, AI015967, AI860350, AI341648, AI200828, AA621573, AA452652, C03793, AA432011, AI638236, AI217938, AA405995, AA447468, AI378270, AI888183, W56659, W56551, AA448474, C05350, AW392861, C03208, AA761808, AI377879, T64861, AA908986, C03729, AI658858, F12348, AA285301, AA405744, AA749175, N94970, N30595, N99058, AI628397, AA446662, AI240555, AA992373, AA514257, AW104676, AA907567, AA450024, R18069, AA496049, AI970903, AI680576, F09967, R42965, AA826528, T72602, AA845274, AI554608, AI973020, AI499447, AA044637, N41837, AA044700, AA477681, W19571, AA337749, N93448, AI434751, D79950, AF151833, AF120324, and AF120323.
HSRAA80	235	1121919	1 - 504	15 - 518	AC006504, AC007788, AC006118, AL020995, and AL031393.
HHEDF50	236	1174682	1 - 511	15 - 525	Y17793.
HHEMK34	237	974395	1 - 403	15 - 417	
HMAGK69	238	1105451	1 - 604	15 - 618	
HNGNW52	239	1132300	1 - 925	15 - 939	
H6EDK67	240	974775	1 - 834	15 - 848	AI740538, AI991063, AI816235, AA989369, AI816180, AI568003, AI879047, AW337566, AI815804, AI401701, AA992003, AA887219, AA314893, AI193891, AA991962, AI870871, AI129251, AA938974, AI937894, AI816312, AA417644, AA972057, AI816219, AA411565, AA984034, AI815497, AI493664, AA419548, AA410528, AA985561, AI969199, AA234347, AA523589, AI201484, AA738149, AA639075, AA714943, AA661984, AW371214, AI373806, D11909, AI698157, AA308942, AI220909, C21419, AI698146, AA165132, AA054834, AI420464, AA644345, T81127,

					AI933854, AI015791, AW104613, AI784278, AA299888, AI014584, T81080, J05069, and AB022714.
HWBCS43	241	1151532	1 - 1357	15 - 1371	AI357653, AI608948, AI984870, AW166141, AA551581, AW026439, AA778606, AI188784, AA776852, AI767102, AA608990, AA614053, AW304727, AA621876, AI401209, AI587455, AI038330, AI859236, AW410945, AW410946, AI004157, AI580925, AI186081, AA595384, AA745049, H98063, AI457441, AI624650, AA527667, AI538446, AA151795, AA044237, AI201917, AA911095, AI337568, AI494401, AI127736, AW021177, AA722805, N35226, AI335664, AA676409, N48676, AA465269, AA524861, AA564716, AA465156, AA082741, AA837389, AW001100, AI355123, AI088852, AI582279, AI274687, AI042077, N31207, N72003, T60404, AI222493, AA468797, W25525, AA432310, AA259143, W92210, T59854, AL038933, W79807, T52903, W92943, AA631684, AI580813, AI687292, AA307699, AA627507, AI051931, AI352208, AA593571, AA653967, AI141158, AA865059, AA665332, AW013811, W92942, AI253542, W69347, AW362490, W69348, AA459913, T74935, R11105, AA804679, AA312627, N44890, AA026643, AA525811, W61261, AA551709, AA442963, T60549, W19343, AA308511, R92670, AA151792, D11941, N53441, F29583, AI908209, AI265903, T52902, AA354120, AI880297, R11051, AA740557, AA298767, AA341112, AA765092, AW439036, T60130, AW379667, AA905842, AI283673, AW379599, AA665413, AA298766, AA742432, AA887844, H02351, T60248, AA353967, W61262, T59910, AA044318, AA026101, AA640804, N45530, H02253, N89468, N99438, T84807, AA034108, AA149577, N36435, AA318267, N85136, AA918517, AA888529, AL134449, AA470866, T59787, AI625142, AF061737, AF221669, AB025405, J05466, AF108945, AF090315, and L11319.
HCE3H71	242	961681	1 - 2035	15 - 2049	AI638508, AW139057, AI654790, AW149807, AI419465, AI569283, R90888, H51217, H29244, R85125, H29245, AA488106, H05353, AI480182, AI500178, F11386, AI873131, AI499775, AI458144, R44423, H05303, H51247, R14779, F05862, F09051, AA338672, R51725, R51648, R42549, R19635, R35934, F07470, Z40525, R49451, R85080, F02105,

					W22746, D29763, D64009, and D64010.
HOFMS43	243	947973	1 - 360	15 - 374	
HOVCO14	244	947999	1 - 580	15 - 594	AI701529, AA994711, AI192036, and AC007198.
HTOBE75	245	1161571	1 - 1840	15 - 1854	AW192827, AA595431, AI251121, AI923335, AI284016, H30141, T70540, T90549, AI432106, AA953436, H27466, R50714, R50249, AI540363, T70809, AI659868, AW370667, AI678688, AI802240, AW004886, AW080379, AI352274, AI254727, AI537677, AI917963, AI491710, AW163823, AI569328, AI249962, AI570966, AI919593, AW088903, AW151714, AW129230, AI539771, AI873638, AI434242, AI801793, AI697324, AI589428, AW162194, AI888621, AI918449, AI587121, AW168451, AW089006, AI812015, AI687287, AI581033, AI590043, AL110306, AI929108, AL138386, AI587606, AI468872, AI699011, AI446809, AI473451, AW080374, AI860783, AW081255, AI859983, AI621341, AW161156, AL047100, AI866608, AW024564, AI352184, AI445620, AL041220, AI367210, AI355008, AW305233, AI499391, AI590601, AW191844, AW085786, AW104641, AI953803, AL036638, AI682743, AI679504, AI954422, AW132001, AA806719, AI569367, AI933903, AI859991, AW021373, AI698401, AW409775, AI567993, AI890574, AI565970, AI624154, AI932949, AI932458, AL036265, AI452876, AI431962, AI636619, AI628217, AA580663, AI338212, AA572758, AI538647, AI610667, AI953880, AI805688, AI619485, AL042382, AI357599, AI687424, AL079728, AI345677, AI889306, AI590686, AL119863, AI922676, AI368816, AI828412, AW088899, AW151136, AI540674, AI539781, AW083778, AW162071, AI683128, AI221035, AI889764, AI364788, AI345688, AI560545, AL045349, AI933992, AI623941, AI540754, AI963040, AI590020, AW103012, AI891102, N57346, AI432736, AL120819, AI288050, AW074172, AI758528, AW059713, AI365256, AI859511, AW193026, AI805769, AI282743, AI280661, AI472536, AW169790, AW193203, AW087954, AI537617, AI680498, AI623736, AI634305, AI919345, AW130863, AI922577, AW088134,

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HCMSL08	246	898203	1 - 1740	15 - 1754	AI141895, AI201842, AI351867, AA251985, AA197256, F20444, AA194198, AI800873, F36894, F26457, AA482914, AA197255, AA482932, F30374, F32249, F27719, F32998, F01019, F01208, F31596, F34858, F00856, F29622, AA194227, F29621, F36047, AA016148, F00201, AA178901, F34860, AA176342, F35465, AA252091, F21999, AA192776, AI023647, F34620, S73775, U93291, M15747, M22717, M22712, M20142, M22714, and M22713.
HDPBS64	247	846624	1 - 743	15 - 757	AA888874, AA992389, and AI767840.
HDTBR50	248	846630	1 - 453	15 - 467	
HTDAB17	249	890384	1 - 591	15 - 605	AW410520, Z21669, AA334183, AW376427, and AC011078.
HABAE22	250	1227053	1 - 1361	15 - 1375	AI630895, AW074246, AW074238, AI971879, AA573790, AI732281, AA775749, AI097431, AI133167, AW272212, AW007382, AI922522, AI476536, AA977131, AI313142, AI829488, AA156751, AI567504, AA707243, AI801581, AA196335, AA523100, AI800972, AI265896,

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HE9MI70	251	1217048	1 - 1938	15 - 1952	AI337094, AW316631, W49570, AA700491, AA434168, AA480122, AI374954, AI368173, AI273067, C05075, AA249368, C04935, AI609285, R13198, AA834371, R13225, R40307, AA490857, AA348046, AA334032, AA683069, AW275432, AW069227, T47138, AI915081, AA682344, AA651639, AI634187, AA224860, AA019804, AA487226, H58354, AA528390, AA582746, AA219349, AI679871, AW023662, AI832009, AA721645, AI457313, AA630923, AC002036, AL023575, AC005089, AP000116, AL121655, AC004923, AC007792, AC006449, AC009044, AL035071, AC007666, AC005972, AL031681, AC004900, AC007225, AC000052, AL031864, AP000687, AC005884, AC004156, AL035587, AC005602, AC006271, AC002126, AC005837, AB015355, AC004019, AF069489, AC007421, AC002350, U91321, AL031291, AL050317, AC006581, AC003692, Z97055, AC003969, AD000092, AC005940, AC005568, Z85987, AC007160, AF196969, AC005696, Z86090, Z97876, AC016027, AC004927, AL020997, AP000689, AC008989, AP000113, AC016830, AP000688, Z98941, AC005722, AC002041, AC008101, AC008115, AL117330, AC004859, AC004815, AP000211, AC005082, AL021393, AF104455, AP000086, AC005907, AP000563, AL049569, AC002301, Z84466, AC005620, AL049697, AL031659, AL031984, AC007917, AC005844, AC005529, AC007437, AC007327, AC003962, AC006241, AC002544, AC002425, Z82205, AL078581, AC005488, AC004975, AC005527, AC007021, AC004596, AC004745, AL031283, AC004000, AP000045, AC004106, AF030453, AC005067, AJ246003, AP000133, AL031683, AL031595, AC008282, AC004253, AC002400, AL031733, U91325, Z99716, AC007011, AC008122, AC006120, AC005411, AC004750, U80017, AP000690, Z82182, AF024533, AL031729, AL022320, AL008729, AC005231, AC005088, AP000131, AP000209, AC006480, AC005235, AL035086, AP000510, AL133246, AC003982, AC005369, Z84480, AP000474, AB014077, AL031300,

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HHFDK15	252	1147850	1 - 2494	15 - 2508	AA102381, AI951899, AI703107, AI419880, AI912273, AI804850, AI887154, AA879129, AA864602, AI969931, AI167957, AA977051, AI243403, AA767639, AA905866, AA921946, AI633925, AI692307, AI016654, AA100863, AA476869, AA084508, AI148775, AI697677, T65447, AA081620, T65370, Z40406, F11740, AW015853, F09269, F09400, AA917724, AI220705, F04025, H17830, F11614, R67955, R66865, AI910366, AA626581, Z44504, AA091214, AI250518, D86980, and AC004816.
HOSNZ11	253	1162664	1 - 1338	15 - 1352	AW003991, AI148174, AI863291, AI057635, AI968770, H09402, AA971937, H09359, Z45655, AI359331, N59010, Z41327, H09342, H09418, N36601, and AC009320.
HTAEW05	254	1151514	1 - 1241	15 - 1255	AI765772, AI028132, AW182888, AI927120, AA825920, AA765784, AA761590, AA676756, AI282202, H55577, AI671077, AA984585, AA161319, AI671517, AA047045, AI739458, AA001398, AA601230, AA493931, AA579188, AL035659, AF188530, AB028954, AL133382, AC006312, AL009174, AL121769, AC007637, AC004687, AF060568, AC001234, AF001548, AC006512, AL022721, AP000300, AP000045, AP000113, AC004453, AC004463, AC002390, AC002492, AC002375, Z49258, AC004938, AC005244, AC012384, Z83843, Z84486, AC004030, U95090, AC008115, U47924, Z85987, AC004031, AC005158, AC005480, AC004638, AC004893, AL049709, AC004750,

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HTTKN45	255	1181807	1 - 1760	15 - 1774	AA307651, AA373934, AA354070, AA370119, AA301228, and AA355552.
HUSJN62	256	923146	1 - 1177	15 - 1191	AI630895, AW074246, AW074238,

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HTEIU92	257	1102681	1 - 550	15 - 564	
HAQMD86	258	1105267	1 - 2767	15 - 2781	AI636559, AW055061, AL079918, AI948517, AI767438, AW237050, AI762385, AW006663, AI391637, AI631872, AI824031, AI803349, AW006910, AA557263, AI817196, AI139327, AI039492, AI684981, AI269195, AI190930, AI554712, AI146637, AI689910, AA455233, W28613, AI290506, AI498042, AA243244, AI669277, R87161, AI245809, H06451, AI458528, AA465611, W86885, AA251480, N91558, N75191, AW204076, W22739, AL135648, N22308, AA243184, AA043090, W26402, R38563, AW369274, AI458648, AA548226, AW369304, AI221069, AW136042, H77665, AA576641, AA293619, AI284500, H78129, W86932, AI867551, R97939, AI127558, R75914, R60919, AA777582, AA853622, F10540, W22844, W19112, AA377671, R12305, H90831, AI473122, AI699758, AA043089, H78130, AI024109, H90779, T75147, R42400, AW058164, AI701015, AI469458, AI033341, AW014864, R77423, AI589658, R39490, R37236, AI696677, Z38489, R87162, F12941, H97820, H97821, R14677, AI818286, AI685907, AA765376, AA332232, AW085853, AA331828, AI951199, AA526471, C20938, AI341357, AA251358, AI739322, AI811491, A83860, D80012, D84096, AP000533, AP000534, AW513983, AW589899, and AW771462.
HBJG02	259	1151462	1 - 1579	15 - 1593	AW340286, AI684793, AA482180, Z35720, AI952956, AA315455, AI472613, C20647, AI446389, AB018272, and D85434.
HBJN65	260	1151463	1 - 657	15 - 671	AI923030, AI026007, and AC002036.
HBMUJ35	261	1195500	1 - 2104	15 - 2118	AI076933, AA528171, AI401590, AI718291, AI689866, AI863198, AW131778, AI038040, AI147972, AI249927, AI365611, AI288899, AI151170, AA700233, H17877, AI954954, AW162862, AI540170, D61629, H17876, AI198286, AW044526, H42874, AI139301, AI242217, Z39310, W79945, AI075889, AA243131, R56563, AA535601, AI741349, AA810355, AA279039, H42938, R75964,

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HCEBP60	262	1227635	1 - 4316	15 - 4330	AI479425, AA398711, AA700162, AI026652, AI123893, AI559289, AI866808, AI457998, AA688243, AL137943, AA701977, AI143298, AI598257, D63219, H30714, AI580255, AI800031, AI187336, AI560097, AW403369, AA973875, AA699888, AI650287, R54495, Z22002, Z40356, AW196903, AW337450, AI648571, R42726, AA594866, W23972, AW001283, AA317722, R20942, Z21999, R36552, AW170403, AI784621, AA322174, Z44429, AI365119, AI699531, AI333430, X93823, AI969540, N55592, N55588, N91854, AA393366, D25908, T11455, N22276, AI049850, AA580663, AW089272, AB023220, Y17457, Y17459, Y17458, M85164, and S52228.
HFGMA55	263	1150870	1 - 721	15 - 735	AI076933, AA528171, AI401590, AI863198, AI718291, AI689866, AI288899, AI038040, AI147972, AW131778, AI249927, AI365611, AI151170, AA700233, H17877, AI954954, AW162862, AI198286, AI540170, AI242217, AW044526, H42874, AI139301, AI741349, AA243131, Z39310, AI075889, H42938, AA535601, R54635, T77063, W74194, AA810355, R75964, T33359, T16677, T33337, R45549, F09103, T76959, R76797, AA339968, AI372458, T47654, N64752, R56564, H06069, R40256, R54900, AA689335, AA449270, AI985867, H07857, AW338102, H75505, AI685474, AA659714, AA336574, AI372459, AW150467, T47653, F06396, N76159, AA449406, H67430, T77369, T77123, H75504, AA279039, AF177758, and AF177759.
HLHTE91	264	789603	1 - 1196	15 - 1210	AI124644, AA256351, AA294967, R71807, AA305696, AW276058, AI631672, AI861834, AI888075, and AB020698.
HLFYI58	265	1151495	1 - 932	15 - 946	AI346680, AW148864, AI435036, AI015214, AI797265, AI125637, AA883976, AA758035, AA205719,

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HNNBJ44	266	1151312	1 - 352	15 - 366	AW392670, AL119497, AW363220, AW384394, U46347, AL119443, AW372827, AL119457, Z99396, AL119319, AL119444, U46341, U46346, U46350, U46351, U46349, AL119324, AL119484, AL119363, AL119391, AL119335, AL119355, AL119483, AL119341, AL119399, AL134533, AL134528, AL119496, AL119439, AL119396, AL134531, AL119522, AL037205, U46345, AL134529, AL042614, AI142132, AL134527, AL134538, AL119418, AL042450, AI142134, AL042965, AL042975, AL043003, AL042542, AL042544, AL042970, AL043019, AL042984, AL043029, AL119511, AL042551, AL119464, AB026436, AR054110, A81671, AR069079, AR060234, and AR066494.
HSLJ46	267	997643	1 - 614	15 - 628	W02311, AA151521, AW367760, R01303, Z21334, AA337415, A83856, D29956, AC004204, AP000508, D84394, and AF057146.
HTFOK70	268	1151518	1 - 913	15 - 927	AA861060, AA457008, AI686550, AA456933, AI146978, R64191, AI636863, R07171, and AA872309.
HUSXO71	269	1164014	1 - 508	15 - 522	AI185977, AA116021, AI222587, AA148178, AW020095, AI345745, AA282824, AW410260, AW410829, AI921254, AA587120, AW162189, AI583966, AI813533, AL047883, AI440238, AW087217, AA729782, AI280786, AW151974, AI635634, AL048499, AI473536, AI866573, AW151979, AI472487, AA954910, AA456793, AI096771, AI439664, AW020619, W45039, AI499325, H42557, AA215584, AI223980, AL037693, AI871977, AI686414, AI762707, AI219380, AI890907, R75918, AI955486, AA983252, AI696809, T66952, AI627714, AW160363, AI560096, AC008079, AC008101, AF176642, AF176651, AF000167, AF091084, M79462,

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HWBDP39	270	1223498	1 - 3163	15 - 3177	AI830320, AI650699, AA425859, AL135164, AW407213, R93643, T08247, AA903976, AI339150, AA393578, D81801, AA069108, H05354, T78715, H17603, AW375579, AA425265, H14868, AA353380, AA382228, T31679, H28195, AI452888, H60758, AW341054, H21724, R44576, H05304, R19312, H28238, AA344135, W24078, R60163, AA397778, AA804197, R47192, R47367, T70745, AA350456, N72648, W03235, N56575, N87382, R72018, R07516, R46310, R73289, R46877, H43991, R94496, R01365, N57940, R46516, AW262539, AA585422, AI811171, AA807691, AI288064, AL046144, AL120300, AL120905, AB028980, E06743, and AF153205.
HKMMQ73	271	840459	1 - 2359	15 - 2373	AL118812, AW188429, AI749512, N40918, AI499154, AA811869, AW021247, N77798, N22272, AI889330, AI357484, N81170, AA811893, AW023573, AI949364, H88291, H88292, N46775, H89526, H89342, AW103567, N54871, AL133897, AA553772, H96737, AI866975, AA515135, AI097558, AI659923, T58105, AA078230, AA078067, AA077989, AA078254, AA078073,

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HVVBK72	272	1179755	1 - 909	15 - 923	AI016826, AW367808, Z99396, AW392670, AL119443, AW372827, AL119496, AL119522, AW384394, U46341, AL119497, AL119319, AL119483, AW363220, U46349, U46351, AL042970, AL119418, AL119399, AL119335, AL119444, AL119363, U46346, U46350, AL119396, U46347, AL119457, AL119484, AL119324, AL119391, AL042551, AL134518, AL119355, U46345, AL119341, AL042850, AL119439, AL042544, AL043037, AL037205, AL134902, AL134528, AL134524, AL042542, AL042980, AL043039, AL079683, AL042995, AL134538, A81671, AR060234, AR066494, AR054110, AB026436, and AR069079.
H7TXB52	273	981972	1 - 1551	15 - 1565	AW073152, AI924256, AI983814, AI826099, AA074665, AA485951, AA555324, AA314946, AI380060, AA147450, AI417718, AA927984, AW157484, AI005367, AI167363, AI582706, AA156460, N94332, AI784341, AW079088, AW139642, AI765898, AA075306, AA035202, AI368582, AI423398, AI764964, AA309913, AI983075, AA489562, AI766272, AI262488, AI183863, N30837, AA084636, AW299506, AA878607, AI913495, AA316253, AL047655, AI267956,

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HDPRY71	274	1217205	1 - 2721	15 - 2735	W35190, AA374753, AW385663, AA411671, AI949995, AW207369, AA476519, AI341954, AA903353, AA625487, AI224849, AI802648, AI804236, AA626114, AA410486, AW408032, W23688, AI268230, AA454636, T05172, AW131859, AW372054, N20256, H91044, AI024730, H82446, AA362688, AA362690, AA362689, T29199, AA743191, AA406500, AI431242, R60628, AA345748, AL044652, AW392670, AL119399, AL119324, AL042544, AL119457, AL119443, AI431305, AI432646, AL119483, AL042551, AW372827, AL134902, AA456248, AL119355, AL119319, U46349, Z99396, AW384394, U46351, AW363220, AL119497, AL119418, AL119484, AL119363, AL119391, U46350, U46347, U46341, AL119444, AL119341, AL119401, AL119439, AL119522, AL043011, AL119496, AL119396, U46346, AL119464, AL134536, AL119335, AL134538, AL037205, AI142132, AL042984, AL134525, AL042975, U46345, AL043033, AL043029, AL042614, AL043019, AL042450, AL042542, AL042965, I58322, I58323, A94048, A94061, AR035224, I66487, A49045, I09252, I09251, I66498, E01324, I08638, A94046, A94054, I09270, I09268, I09269, AR038321, I07209, I07249, AR068508, AR068510, AR067734, AR068509, A63954, I91969, A49701, A29109, A32111, I66495, AR068550, A23373, AR068551, I66494, I66497, I66496, I66486, A27169, A27170, A39929, A83151, AR067731, AR067732, AR038307, I09267, AR051537, AR051524, Y17793, AR066494, AB026436, A42964, AR060234, AR054110, A81671, and AR069079.
HGOCA12	275	968763	1 - 347	15 - 361	AA346095, and AA461361.
HHJCJ29	276	1077517	1 - 2336	15 - 2350	AI986076, AI924027, AI923229, AW295444, AW293487, AW294040, AI363324, AA758236, AW137221, AI754532, AW071727, AI520903, AI674771, AA458935, M62236, AI150122, AW451151, C75369, AA632097, AA419026, H39019, AA766882, AI499027, AI138566, AI671505, AW028701, AI936956, AA927200, AI499889,

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HODGC61	277	973449	1 - 512	15 - 526	AC020695, AC020695, AC017086, and AC017086.
HBXGQ52	278	1229467	1 - 1243	15 - 1257	W22076, E16366, and I21539.
HE2JS39	279	1121932	1 - 776	15 - 790	AI082067, AI741256, AI146716, AI808344, AI192718, AI218348, AW263730, AI760268, AI334351, AI038323, AA418248, AI192996, N41765, AI333609, AI342187, AI354288, AI189779, AI241881, W87873, AI291811, W69541, AI334089, W69457, AA002244, W87775, AA115572, R79274, H87504, W20424, N91135, R31051, AI868502, R33909, R81271, N47926, W06960, AI191011, AI470433, AW044117, R31134, AA971376, AA969755, AA960886, Z20835, Z20837, Z20838, Z20805, Z20843, AA918440, N29378, AR069078, AF102166, A75045, A75047, A75048, A75017, and A75053.
HE7SH21	280	960302	1 - 1475	15 - 1489	AI768135, AW163291, AI815943, AW157281, C15942, AW163553, AI768145, W95728, AW157634, AI498009, AA125928, W95771, AA161306, AA774145, H20587, H26980, AA219548, AA774146, AI815750, H49744, R12017, Z45837, R39856, R44419, Z41474, R19631, R89506, D44823, and AL035462.
HMIAO23	281	1103488	1 - 993	15 - 1007	H15302, R20857, Z44841, T34574, AW380909, AW274431, Y17849, Y17850, and AL110252.
HELDW45	282	944301	1 - 579	15 - 593	
HSRBB31	283	1121889	1 - 851	15 - 865	R58571, and R58572.
HTEOW39	284	1151517	1 - 642	15 - 656	AI564426, AL037030, AW089006, AW151136, AI241901, AI309306, AI365256, AI569945, AW020419, AI473451, AA911767, AI824648, AW084447, AI890507, AI886055, AI249877, AI698391, AI932794, AI251221, AA456793, AI637584, AI917963, AI916419, AW087455, AI633125, AL038665, AI524179,

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HE2PE32	285	1106571	1 - 548	15 - 562	AR012068.
HSIDW39	286	1211446	1 - 885	15 - 899	H60622, AI796110, T83017, AI796175, AW242457, AW235515, AI433547, and U50545.
HPMLD30	287	1226192	1 - 3475	15 - 3489	AA653812, S78429, E03539, and X01966.
HOEKP17	288	1204712	1 - 2226	15 - 2240	AI911592, AI582274, AA400638, AA166937, AA402257, AA287189, AI377981, AA402753, AW269430, R66033, AI027183, AW073084, AI368056, AA287098, H02704, AI286063, R66058, R77852, AA400321, AA768662, AF121186, AA600147, AA884222, AA360693, AA166757, R70070, AA701028, R66059, R66034, AA732603, AA383050, AA808031, R70025, R77761, R81479, R36810, R81672, D20612, AF169803, and AL034347.
HFXDP67	289	1228141	1 - 3396	15 - 3410	AI526017.
HJABA59	290	1199933	1 - 1972	15 - 1986	AL046883, AI680201, AA242870, T26679, AI654983, AI033997, AW168011, AI027905, AW135499, AA905139, AI276625, AI091577, AI536117, N29717, AI580777, AI142966, N44258, AI080198, N36383, AA451664, AA416936, AW264871, AA484628, AI373715, AA782062, AA279695, N29688, H70102, AA085543, AA905280, AA252150, AA355001, N23998, AI061048, AI220668, N94585, AA469901, AI758177, AI950700, R17835, AL079567, N56727, R34816, H02679, N56697, AA322063, AI984621, AI984388, T32386, AI872682, D61122, AA781328, AI579968, W23792, AI016080, AW170391, AL046884, AI089223, AA279726, D81434, T97980, R34706,

					T97979, T25520, AI956018, AA342222, AF025794, AF121214, AF121213, AF121212, AF121210, AF121208, and AF121211.
HKIXB03	291	1129055	1 - 631	15 - 645	AA534863, AI807346, AI807337, AA814725, AA860170, AA862556, AI342011, AA746476, AI167626, AA425316, AA063596, AI830609, N90805, N50990, AA927981, AI565166, AI700334, AA721653, AI924447, AA928627, AA047076, AA844403, R41759, AI651907, H15256, F07545, F06839, R55583, H44039, W19518, AI952216, AI952225, AI658871, AA877252, AL133582, and AF169802.
HKMMF49	292	1124742	1 - 1013	15 - 1027	AI742260, AW418588, AW380457, AA456001, AW391502, AA919129, AI241222, AI570184, AI624542, AW380438, AI433445, AI016052, AI935422, AI284575, D80179, AW024435, AA876251, AW370994, and AW370944.
HLDOG51	293	1151491	1 - 1247	15 - 1261	AA625096, AI760763, AA558453, AA211370, AI277233, Z25220, AI949428, AI991563, AA323998, T52468, AI364908, F00295, AI364281, and T56301.
HSVAI25	294	1130819	1 - 773	15 - 787	AI088055, AI051368, AA659182, N72718, AA584123, AA644090, AC005225, AL109798, AC005182, AC004525, AC005003, AC004551, AC007182, AC003101, Z84469, AL031427, AC005015, AL034423, Z98941, AL034400, AC008119, AL034402, L78810, AL080242, AC010206, Z97055, AC002350, AC008101, U62317, AC008372, AC005284, AC003046, U52112, AC016027, AC016830, AC004991, AC004032, AC002385, AL022238, and AL008726.
HSXCP56	295	924635	1 - 950	15 - 964	W19518, AA425475, AI807337, AI807346, AI830609, H44111, AA036677, AA814725, R17206, AA339782, AA534863, AA047075, AI904497, AA425316, AI342011, AI167626, AA862556, AA746476, AA063596, AA860170, F07545, F06839, AA927981, H15256, N90805, AI565166, R55583, AA877252, N50990, AI700334, AA721653, AA047076, AA928627, AL133582, and AF169802.
HBCAT08	296	1167275	1 - 4315	15 - 4329	AI186513, AW084503, AI819855, AW377487, AA639852, AW377564, AW137025, AI754458, AA029866, AA775721, AI806585, AA716174, AW389528, AA461165, AA488403, AI989581, AA152257, AI375044, AW084696, W72645, AW389530, AA151274, AI753033, AA668610, W93716, AA461339, AI804151, AW262139, AI352683, AW152443,

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HHFBU53	297	1048855	1 - 570	15 - 584	H55804, R17185, D28514, D28513, D87994, D87993, D87995, M80482, AB001906, AB001905, AB001904, AB001903, and AB001907.
HTTDO45	298	942505	1 - 2021	15 - 2035	AI356346, AA773564, AW149620, AI608941, AI934471, AW166202, AW248975, AI927017, AI927649, AI935538, AI689743, AW237367, AA669837, AA773811, AI826904, AA522692, AI985556, AA160675, AI766899, AA129593, AI242161, AI339338, AI915875, AI281977, AI679419, AA743161, AW129250, AI292110, AA995857, AI632625, AW005265, AW205957, AA031697, AI080003, AI985496, AI640340,

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HTPII72	299	1104236	1 - 692	15 - 706	W27420, M78120, AC004211, AC005937, AB023048, AP000511, and AL122037.
H6BSE22	300	1151371	1 - 649	15 - 663	AI806796, AA740715, AA205032, AA687336, AA909749, AI803338, AI720241, AI248115, AA728749, AI244027, AA358831, AA356521, AA205681, AI221835, W57837, and AF126736.
HDPAB43	301	1220621	1 - 3628	15 - 3642	AI954606, AL042215, AL048436, H06768, W26643, AI962184, AI650383, AA281450, AI382039, AI125170, AW241906, AI862045, AA351117, AW407638, W27754, T09466, AW407356, T33860, AA806369, AI902163, AI206301, T78367, W28111, AA340770, AA349910, W27048, R17004, T09384, AW382242, AA701415, AI132992, AI372668, AA349195, AA180230, AA490675, AW386034, AB028986, AL049258, AC007312,

					AF118067, and AW589858.
HDPFM16	302	1193042	1 - 2116	15 - 2130	AI347260, AI056270, W87850, AI992086, AA284365, AW390519, W00688, N78231, W20420, AA262876, Z45502, AA477059, F08122, N55729, R16333, H68037, F06272, AW361275, T96033, AI701434, AA043526, H90951, AA101843, AA028059, AA101844, AI247955, W87590, W00863, AA314665, AI568114, AW189250, AL120676, Y14314, and E12705.
HFPCN10	303	1151478	1 - 1108	15 - 1122	AA016989, AA054177, AA248763, and AC004895.
HLQFO35	304	1161174	1 - 1068	15 - 1082	AI979288, N51106, AW263802, AW170026, AA020944, AI660372, N22360, AI247970, AA856768, AA452217, H81603, AW339837, AA926997, AA370062, N54865, N54231, AA362770, AL045803, AI784057, AI049830, AI820798, AA427374, AI401089, AI474187, AI821377, AI948443, AA579853, AC005095, AC005911, AL121578, AC005162, AC007376, AC005053, AL034402, AL117338, AC005792, AC009399, AC004103, and U52112.
HMWU94	305	1150834	1 - 559	15 - 573	AW295518, AI269069, and AA470095.
HSATQ28	306	1124600	1 - 948	15 - 962	H58978, AI241390, AW405039, AA223756, AI064938, S80876, and U40462.
HTPIL46	307	1196787	1 - 2474	15 - 2488	AW137063, AI473912, AA044687, AI130924, AA056651, AA150290, AA150588, AW339573, AI262260, R00053, AI093126, AW339565, W68002, W67990, AW026865, AW303604, AA699316, AA731089, H72685, AA044899, AI583379, H72684, AA143094, Z19127, AA609380, H14362, R16573, R46567, AA677286, AB020656, and AF161542.
HNGEN37	308	1103305	1 - 518	15 - 532	
HLMD077	309	974855	1 - 633	15 - 647	AI302099, D80253, D59859, C14389, D80366, D51423, D57483, D80188, D80227, D59889, D59467, D80166, D59619, D80210, D51799, D80240, D80269, D80391, D81030, D59787, D58283, D80212, D80022, D59275, D80248, C14331, D80219, D80024, D80195, D80196, D80164, D80043, D59502, D80251, AA305409, D59610, C14014, AA305578, D81026, D80133, D80378, D80522, AA514186, C15076, D59927, D80038, D50979, D51022, D50995, D80193, D80045, AW177440, AA514188, D80241, D51060, AW360811, D80268, AW178893, C14429, AW377671, AW375405, D80439, C75259, D80302, T03269, AW179328, D80247, D58253,

					AW366296, AW360844, AW360817, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, AW178906, AW177501, C05695, AW177511, AW378532, D80134, D59373, AW352171, AW377676, AW177505, AW352170, AW177731, D80132, AW178907, AW178762, AW179019, AW179024, D51079, D80157, D51103, D51250, AW360841, AW179012, AW179020, AW178775, D51759, AW367967, AW178909, AW177456, AW369651, AW352117, AW179329, AW178980, AW177733, AW378528, AW178908, AW178754, AW179018, AW352158, AW176467, AW179004, AW178914, AW378525, D80949, AW178983, AW352163, F13647, AW352174, T11417, T48593, C14227, D45260, D80168, AI910186, D59653, AW179009, C06015, AW177728, A62298, AR018138, AR008278, A84916, A62300, AB028859, AJ132110, AF058696, A82595, X67155, Y17188, D26022, Y12724, A25909, A67220, D89785, A78862, D34614, A94995, AB002449, AR060385, AR008443, D88547, I50126, I50132, I50128, I50133, X82626, I82448, AR066488, AR016514, AR060138, A45456, A26615, AR052274, AR054175, AR025207, I14842, Y09669, A43192, A43190, AR038669, AR066487, AR066490, A30438, I18367, AR008277, AR008281, D50010, Y17187, A63261, X64588, AR008408, AB012117, AR062872, A70867, AR016691, AR016690, U46128, X68127, D13509, A64136, A68321, AR060133, I79511, A85396, D88507, AR066482, A44171, A85477, I19525, A86792, X93549, U79457, AF123263, AR032065, X72378, and AR008382.
HNKAZ51	310	1154961	1 - 988	15 - 1002	U77054, Z99396, AL119457, AL038837, AL037051, AL036725, AL039440, AA631969, AL039074, AL119324, AL036418, AL119399, AL039085, AL036858, AL039564, AL039156, AL038509, AL039108, AL039109, AL039128, AL036924, AW392670, AL134524, AL119443, AL037094, AL042544, AL039659, AL038531, AL036196, AW372827, U46341, AL119497, AL039625, AL039648, AL045337, AL038447, AL036767, AW384394, AL037082, AL037526, AL036190, AL037639, AL039678, AW363220, AL039629, AL119319, AL039423, AL036238, AL119363,

					AL039150, AL119391, AL038520, AL040992, AL042909, AL119335, AL037077, AL119496, U46350, AL119484, AL119483, AL037726, AL119341, AL119355, U46346, AL119522, AL038851, AL119418, U46349, AL039410, AL119396, U46351, AL036998, AL037615, AL037085, AL036733, AL039386, AL134528, AL036268, U46347, AL119444, AL042614, AL042975, AL119439, AL037027, AL037178, AL134533, AL045353, AL037205, U46345, AL134518, AL036765, AR060234, AR066494, AR023813, A81671, AR064707, AR069079, AR054110, AB026436, and AR064706.
HOGDR01	311	919899	1 - 1338	15 - 1352	AI805425, AW273749, AA884001, AW276210, AW317074, AW295870, AW383315, AW152554, AI940071, AI969215, AW383305, AW383297, AW083601, AI249364, AI566393, AI739044, AI357916, AI671350, AW304326, AW079920, AW083723, AI274014, and AC003965.
HUKEP18	312	957456	1 - 838	15 - 852	AA203189, AI057441, AW139922, AA719156, AI653844, AW104223, AI208345, AI535660, AI536138, T18597, D80045, AI535639, D59751, AI557262, C15076, D80164, AI557084, D59467, R29657, C14331, D80193, AI526078, AI525856, D81026, C14429, AI541365, D59787, AA585439, C14389, AI525556, AW366296, D80195, D80227, D59502, AI557533, AI525316, D50979, D81030, D59275, R45895, D80269, AI541205, D59927, D80022, D80188, D58283, C15406, D80166, D51799, D59859, D59619, AI525500, D80210, D80391, D80240, D51423, D80253, D80043, AI557864, D59610, AA305409, D80212, D80038, D80196, D80219, D57483, AI905856, D80366, D80378, D59889, D50995, AA585098, D52291, D80241, D80251, D80024, Z32887, AW177440, AI541356, AI557731, Z33559, D51022, AI557602, AA305578, AW375405, C14407, AW378532, R28735, R29445, D51060, D80522, R28967, D53161, D57491, T03269, AW178893, C14014, R28892, AA585378, AA585325, C75259, AA514188, AW179328, R28965, AI557155, AA585101, T11417, R29218, Z32822, D80248, D54897, D51250, AW369651, AI557751, AI541535, AA514186, AI541346, AI535686, D80134, AW352158, AI540903, D58253, AI557809, AI540974, AW375406, AW178762,

					AW178775, AW177501, AW177511, D80133, AA969188, D80258, AW176467, AW360811, D80268, C05695, D61185, AI557082, AA585356, D60765, F13647, D60844, C14077, AW352117, AI546829, AW377671, AI557408, AI910186, D80132, AW378540, D80302, AI526184, AW360844, AW360817, AW378534, AI541034, AW179332, AW377672, AW179023, AW178905, C06015, AI541517, C16294, T48593, AI546875, AI546999, AI557241, D80439, AW352171, Z21582, D59373, AW377676, AW178906, AW352170, AW179018, AI541321, AW179024, AW177731, AI557734, AI557317, D80247, AW178907, AW179019, D51213, D81111, AI557787, AW177505, AI546971, AW179020, AW360841, AW178909, D59627, AW177456, AW179329, D51103, AI557727, AW178980, AI557852, AW177733, AW378528, AW178908, AW178754, AI541374, AI526194, AW360834, AW352174, AI536070, AI546945, D80014, AW179004, AW179012, AF100707, A62298, A62300, A82595, A84916, AR018138, AR038855, Y17188, U87250, AR016808, AR062871, AJ132110, I19525, Y17187, AF058696, A25909, X67155, D26022, AR008278, AB028859, A67220, D89785, A78862, D34614, X82626, A94995, AR031365, D88547, I82448, Y12724, AB002449, AR025207, AF006072, U94592, AR016514, AR060385, A43190, A44171, AR031358, A30438, Z30183, X68127, AR008443, A82593, AB012117, AR050070, AR062872, AR038669, I50126, I50132, I50128, I50133, A85396, AR066482, AR066488, A85477, AR060138, A45456, A26615, AR052274, A86792, X93549, D50010, Y09669, A43192, AR025466, I14842, D13509, AR066490, AR066487, I18367, AB023656, D88507, AR054175, X76012, AR016691, AR016690, U46128, AR008277, AR008281, A63261, AR008408, A70867, AR017826, X82834, I79511, U79457, A64136, A68321, AR060133, AF135125, AF213384, AF123263, AB033111, AR032065, AR060382, X93535, and AR008382.
HWHGF95	313	1155021	1 - 1351	15 - 1365	AA583908, AF135026, and AB012761.
HEMFC61	314	836514	1 - 701	15 - 715	AB015226, AB015227, AB015228, AL110299, X99273, and U60063.
HEOQP44	315	942596	1 - 1810	15 - 1824	AL042026, AL040542, AL042640, AL042540, AL046135, AL041808, AL044178, AL044364, AL043613,

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HHEKZ12	316	878267	1 - 428	15 - 442	AL042026, AL040542, AL042640, AL041808, AL042540, AL044583, AL046135, AL046244, AL041936, AL043604, AL043201, AL046383, AL039689, AL043218, AL042346, AL044015, AL043425, AL043424, AL045991, AL079876, AL042700, AL044377, AL043468, AL043795, AL043128, AL042245, AL044029, AL044771, AL042712, A25392, I03356, A78783, A78785, A78787, A61052, I02541, A60955, A21624, A25853, A02712, A02710, E12615, AR035193, A60975, A84772, A98767, A13388, A21625, A68112, A68104, E14304, A47368, I01971, A07700, A02228, A02230, A13392, A13393, I62368, AR031488, I13521, I19516, I19517, A98467, A84776, A18756, A71435, A00781, A84773, A84775, I52048, A93963, A93964, A27396, A95052, I63120, A68114, A38214, AR027070, AR043602, AR067733, A76773, AR062871, AR017907, AR043603, A84774, AR043601, A22413, A95117,

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HHELA35	317	878217	1 - 449	15 - 463	AL042540, AL042026, AL040542, AL042640, AL041808, AL046135, AL044583, AL041936, AL046244, AL043604, AL043201, AL043218, AL046383, AL039689, AL042346, AL044015, AL043425, AL043424, AL045991, AL079876, AL042700, AL044377, AL043468, AL043795, AL043128, AL042245, AL044029, AL044771, AL042712, AL043867, AL049007, AR017908, A78783, A78785, A78787, I03356, I02541, A60975, A61052, A60955, A21624, A25853, A02712, A02710, E12615, AR035193, A84772, A98767, A13388, A21625, A68112, A68104, E14304, A47368, A07700, A02228, A02230, A13392, A13393, I62368, AR031488, I13521, I19516, I19517, A98467, A84776, A18756, A71435, A00781, A84773, A84775, I52048, A93963, A93964, A27396, A95052, I63120, A68114, A38214, AR043602, AR067733, A76773, AR062871, AR017907, AR043603, A84774, AR043601, A22413, A95117, A95051, A18053, AR027100, AR029418, I44531, I28266, AR067734, AR067731, AR028669, AR028668, AR028667, AR028670, A00784, A00783, A18050, AR037157, AR054109, A71440, A44171, A23334, A75888, I70384, I95540, AR018924, A60212, A84746, A60209, A60210, A32110, A63067, A64973, AR067732, A51047, A63064, AR029417, AR018923, A60111, A60211, A48774, A23633, I21869, A29109, A60109, AR007512, A63072, AR028564, A49700, A25909, AR031375, A48775, A23998, AR068507, AR068506, A86792, A58522, A83642, A24783, I44516, A58525, A24782, A83643, A49045, A91750, AR009152, AR009151, AR000006, I60241, I60242, AR000007, AR028672, E16678, A58526, A82653, AR038066, A58524, I50882, A58521, A91753, E16636, A83151, A58523, A93016, AR020969, I01971, AR027070, E00974, I84555, E00954, E00952, E00953, E00955, I08049, I66488, A20702, I66489, I43960, AR021440, A49987, A37074, A37075, E03165, E02221, A10359, E01614, E13364, I12243, I12244, A49702, A10360, A13038, E02679, E02104, E02098, A29289, A42484, A42481, A52326, E02001, E13740, I09342, E01718, E02003, E02102, E03550, E02096, A28163, E02100, I66490, E01997, A58998,

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HSYBQ34	318	918789	1 - 160	15 - 174	A82653, E16636, A18869, A18870, A24410, AR038066, AR027920, AR027921, I00670, I03513, AR027917, AR027918, A48542, AR027922, E00624, E00623, A16272, A16273, AR062136, I06768, A16270, A16271, I07094, E00272, I07863, E16678, A25933, A00181, A28884, A28886, A28889, A28863, and A28870.
HFCBA44	319	948533	1 - 486	15 - 500	AA450272, AA339398, AC009084, AC009084, AC027131, and AC027131.
HOUBE50	320	948519	1 - 229	15 - 243	AA578623, AB033086, AC010979, and AC010979.
HDPAS16	321	734057	1 - 482	15 - 496	AW410916, and AA337013.
HFLAA23	322	960332	1 - 771	15 - 785	AC073744.
HCFMZ90	323	922112	1 - 867	15 - 881	AA099896, W39462, W93311, AA704134, AA102091, AA934684, AA570036, AA973597, AI984459, AA503779, AW073912, AA808602, AA149171, AI984559, AA832230, AA374289, AA651931, AI826677, AA149172, AA715137, W44955, AA046081, AI377362, and AC024247.
HFCES27	324	1103330	1 - 1187	15 - 1201	AA704134, AA102091, AA934684, AA570036, AA973597, AA832230, AA503779, AW073912, AA808602, AI984559, AA651931, AI826677, AA149172, AA715137, W44955, AA099896, AA374289, AI263829,

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HSDFK78	325	1155464	1 - 292	15 - 306	
HSDJX58	326	891067	1 - 1475	15 - 1489	AA570522.
HSLHV27	327	1105339	1 - 999	15 - 1013	T03269, D80212, D58283, D80166, D80195, D80193, D59927, D51423, D59619, D80210, D51799, D80391, D80240, D80253, D80043, D80227, D59859, D80196, D80188, D80219, D80269, D80038, C14429, D59889, D81030, D80366, D59502, D57483, D80022, D59275, D80045, D59610, D80024, AW178893, D80378, D50979, D50995, AW177440, C14389, AW179328, D59787, D80241, C14014, C75259, D80164, D51060, AI905856, C14331, D80134, D59467, AW378532, C15076, D51097, AW178775, AW177501, AW177511, AA305409, AW352158, D81026, AA285331, F13647, AW178762, AW352117, D80949, D80168, AW360811, AW176467, D51022, D58253, D80522, AW377671, AW377672, AA305578, AW375405, AW360834, AW360844, AW366296, AW360817, AW179023, AW375406, AW178905, AW378534, D80248, AW179332, AW352172, AW177731, D59695, D80251, AW352171, AW377676, AW179019, AW352170, AW179024, AA514188, AW178907, AW179220, AW177733, AW177505, AW179020, AW178909, AW177456, AW378528, AW179018, D80268, AW179329, AW178908, AW178754, AA514186, D80133, AW178906, AW178980, AW367967, AW179004, AW178911, AW178914, C05695, AW352174, AW178774, D80132, D80302, AW178983, T48593, D80439, D80247, AW177723, AW378533, D80157, D51103, AW367950, AA033512, AW178986, D45260, C06015, AI535850, C14975, AW378542, D80314, C03092, AW360855, AI525923, AI525913, AI525917, AA514184, AI535959, A84916, A67220, D89785, A62300, A62298, A78862, AJ132110, X67155, A25909, Y17188, D26022, D34614, AR025207, D88547, X82626, AR018138, AB012117, Y12724, A85396, AR066482, X68127, A44171, AF058696, A85477, I19525, A86792, AR008278, X93549, AB028859, U87250, A94995, AF135125, AR008443, I50126, I50132, I50128, I50133, AR016514, A82595, AR066488, AR060138, A45456, A26615, AR052274, D88507, AR064240, A43192, A43190, AR038669, A30438, D50010, Y09669, AR060385, I18367, AR066490, AB002449, AR066487, AR008408, AB033111, Y17187, A63261,

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HNGFU12	328	1128272	1 - 758	15 - 772	D80253, D80366, D59467, D59275, D80022, D58283, D80195, D80227, D51423, D80269, D80043, D57483, D80164, D80038, D59859, D59502, D51799, D80391, D80166, D59619, D81030, D80210, D80240, D59787, D80193, C15076, D80196, D59889, D80212, D80188, D50979, D80219, C14331, D59927, D80378, D80024, D50995, C14389, D59610, AA305409, D80045, C14429, AW178893, D80241, T03269, C75259, D51060, D58253, C14014, D51022, D80251, AW378532, AA305578, D80134, AW179328, AW177440, AW178775, D80248, D80522, AW369651, D51250, AA514188, D81026, D80168, F13647, D51079, D59695, D52291, AW352158, D80133, AW178762, AW378540, C14227, AW360811, AA514186, D81111, C14298, AW177501, AW177511, D80064, AW377671, AW375405, C14407, D80268, D80132, AI905856, D80302, C06015, AW352117, AW366296, AW176467, AW360844, AW360817, D80247, AW375406, AW378534, Z21582, AW179332, AW377672, AW179023, D80439, AW178905, AW360834, AW178906, AW352171, AW179024, AW377676, AW177505, AW352170, AW177731, D51103, AW178907, AW179019, D51097, AA285331, AW179020, AW178914, AI557751, AW178909, AW177456, AW179329, AW178980, AW177733, AW378528, AW178908, AW178754, AW179018, AW352163, AW178983, D80157, AW179004, T11417, D51759, AW378525, D59503, AW177728, AW178774, AW178911, AW378543, AW352174, T48593, D80258, D58246, AI557774, AW178781, D59627, D58101, D45260, AA809122, AI525923, AW177723, AW367950, H67854, C03092, AI525242, H67866, AW367967, AI525917, AW378533, T03048, T03116, AI535850, AI525227, D80014, AW178986, D59317, D45273, D51213, AI525920, D59474, C14973, Z33452, AI535686, C14344, D51221, AI525235, D59551, AA514184, AI525222, AI525925, AI525912, C14046, AI525215, AI525237, AW378542, AI525228, C16955, AI525928, T02974, C05763, AL050337, A62298, A84916,

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HWLKA89	329	1105515	1 - 940	15 - 954	AI823404, AA614088, AA720986, R67736, AA779031, AA165418, AA074907, AA485961, AA167191, W19842, AA533356, AA318991, T86894, AA983883, AI344817, AW079315, AI919593, AI335426, AI348777, AW161202, AA806719, AL040694, AI446809, AI468872, AI254597, AI565970, AI540754, C16221, AI634305, AA603709, AL120300, AI582871, AI565172, AI364788, AI866820, AI318280, AI590043, AI254042, AI873638, AI933992, AA761557, AA464027, AW151979, AI890628, AA715307, AI917963, AA809974, AI687166, AI801793, AI866469, F36308, AA748353, AI623622, H89138, AI802372, AL039390, AL036638, AL045500, AA769318, AI251221, AI336575, AI623736, AL110306, AL036631, AI627604, AI929108, AL039086, AW162189, AI610667, AI114540, AI433037, AL048323, AI866465, AI252023, AA464646, AL048340, AI568060, AW198075, AI963617, T99953, AL037582, AI869125, AL037602, AI573026, AI073952, AI345608, AW021373, AI524663, AI573093, AL119791, AA830821, AI433157, AI648567, AI554821, AW151136, AI539771, AW162194, AI802240, AI537677, AI494201, AI349598, AI890907, AI961589, AI500659, AA641818, AW089006, AI538885, AI345471, AW269097, AI470293, AI815232, AI801325, AI500523, AI538850, AI307285, AI887775,

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HLWBU48	330	1162653	1 - 1701	15 - 1715	AA142936, AI470176, AA150626, R76815, H08328, R75984, C16725, R27971, AI686059, AI650424, AA974022, AW206777, AW363128, AI524727, AI702823, AA286700, H58559, R28225, AI932949, AA806719, AI689420, AI805638, AI890057, AI866820, AI758512, AI917963, AI242248, AI537677, AI678446, AI251830, AI521560, AI281772, AW161202, AW131999, AI309306, AW104141, AW152550, AW059713, AI473451, AL040241, AW079334, AI345551, AI446373, AL036705, AL049053, AW082532, AI499986, AW083804, AI367210, AI432644, AW082623, AL040011, AW168875, AA070889,

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HWWEY71	331	1204720	1 - 2007	15 - 2021	AW411251, AW411250, AW411276, AI638143, AI653986, AW411277, AW411540, AL135023, AI609108, AW410822, AW411486, AW410724, AW410456, AW410516, AW410459, AW411541, AW410899, AW411176, AW411154, AI591086, AW411490, AI951452, AW411012, AI421521, AW249463, AI691054, AW248301, AW410898, AW410455, AI700140, AI950991, AW249523, AI635841, AA911634, AI632983, AW411487, AI887587, AW273145, AI817987, AW411013, AW082929, AW411175, AA576614, AA633317, AI597735, AI569538, AW069245, AW410821, AW410324, AI625764, AA743215, AW410238, AI560282, AI247281, AI554740, AA586625, AI653600, AW304985, AA911054, AI338283, AA165578, AI285121, AI340965, AI090753, AW411386, AW410935, N70336, AA640605, AW410389, AI341964, W73762, AW410460, AA643283, AW411387, AI313459, AW411155, AW411158, W44660, AA742919, AW247727, AW410722, AW411162, AA629927, AI126885, AW410517, AW410636, AW410637, AW410388, AA989313, AA410805, AI308864, AW386906, AI566847, AA313516, AW246735, AA636134, AA219137, AA728778, AA252291, AI350355, AW190316, AA564212, AA131090, AW410725, AA643582, AW410723, AW250287, AI318431, AW250477, AI268503, W73771, W04138, AA812321, AA323741, AA171436, AW246316, AI014771, AW411492, AA086186, AA912198, AA131143,

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HHFGD45	332	1151161	1 - 902	15 - 916	
HNHEB44	333	1161293	1 - 697	15 - 711	
HMACX92	334	1151497	1 - 1350	15 - 1364	AI953998, AI741818, AA573827, AI742027, AI344703, AI687918, AI738917, AI241423, AW058506, AI307806, C16636, AW293247, AI524349, AI913588, AA320459, AI971693, and AA581056.
HNTBW57	335	1193070	1 - 1629	15 - 1643	AI652691, AI673330, AW002530, AA442057, AI968753, AI748864, AA333366, AA368486, AA441944, AI696583, AI224373, AL048499, AI678833, AW083750, AI765323, AW023871, AW150778, AI801536, AL043152, AW263569, AA761557, AI872472, AA207067, AI689096, AW302708, AI815239, AI336586, AL042544, AW081268, AW302854, AI349944, AI537516, AW271119, AW080076, AW151451, AI538908, AW129947, AW190297, AI624475, AI345148, AI688959, AI886355, AI335209, AI334450, AW020381, AW268220, AL079996, AI351737, AI886055, AI285439, AI446567, AI677797, AI613548, AI491710, AI692941, AI694190, AI635528, AI349004, AW131112, AI568061, AI684285, AI432532, AI925281, AI560545, AI689614, R20540, AW150750, AI499104, AA643236, AL043089,

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HBSDC13	336	1105677	1 - 978	15 - 992	
HCWBX21	337	920486	1 - 434	15 - 448	AC034250.
HFRBW72	338	916944	1 - 666	15 - 680	AI526017, AC020876, AC020876, AC020887, AC020887, AC020887, and AC078913.
HSLJX23	339	1105530	1 - 483	15 - 497	
HSLJX90	340	1105297	1 - 424	15 - 438	
HAUAI67	341	1102604	1 - 924	15 - 938	AI990409, AI056896, AI200949,

					AI337884, AW104443, AW055339, AA911567, AA046828, AA932357, AI023297, AI125234, AA904609, AI733426, AW250547, AA910576, AI377004, AA046871, AI090522, AI791736, AI032574, AI140513, AI355194, AI146665, AA972188, AA985450, AA643701, N27384, N30911, AA938964, N58077, AA005074, H59617, AA505790, N57685, AI807795, N55023, N41842, AI078181, H59658, H75736, AI079135, AI672631, H13146, H90608, AI808881, H58325, H67713, AA807988, N32135, AA004517, N77541, AA705231, H13147, H83720, N64292, AW249886, H75871, AA460432, N56775, N30598, N77212, H58714, AW376655, AA368114, AA379597, H64100, AW376078, T96922, D60596, AA622435, H90512, T97029, AA263084, AW067367, AA864550, N56803, AA993476, AA922842, AA004600, D19848, AA968872, AA285312, U74656, and AF161499.
HDPTA89	342	953718	1 - 495	15 - 509	AA314553, AA442034, AA411279, W90647, AW408501, AA426192, AW404831, AW439303, AA337765, AR044460, AL096805, and U93242.
HMCBN45	343	927125	1 - 1033	15 - 1047	AI763246, AI142222, AA243784, AA683518, AI799788, AI123897, AA306113, AI139363, AA178940, AA585431, AA179031, AI128697, AA806862, AI245705, AI082068, AI697113, W31054, AA521489, W01944, AI799759, AI143831, AA991864, Z28358, AI306133, AI524377, AA355942, AI688376, AA622974, AI669951, AI291759, AA356387, AA129598, W52055, T55794, AA143357, AA693716, AI082052, AA354273, AI734980, AA384235, AI272802, W60600, AW151717, W26194, AA256518, AA761727, H57081, AI205579, AA676825, AI147942, AI935114, AI168491, AI867526, N29537, AI694140, T55364, N29540, AW175871, AI473097, N68501, AI696177, AA977687, and AW204367.
HTTJY18	344	1223495	1 - 2911	15 - 2925	AI557497, AI766034, AI346436, AI693265, AA625367, AW119055, AI160450, AI797257, AA044667, AA490784, AI017930, AI798116, AI991629, AW408108, AL134814, AI751104, AI671520, AA631316, AA767225, AW118565, AI692421, AI806219, AW404045, N34063, AA865477, AW444920, AI338294, N25707, AA478628, AI128490, AL135604, AA574142, AI807827, AA724644, AA156896, AI375320, N20622, AI681820,

					AW001622, AA435533, AI970650, AI867384, AA166738, AI160087, N34090, AA488873, D82419, AA772221, AI927358, AA831431, W19430, AI984819, AI689872, AA614686, AA551244, AI014617, AA922932, AA594011, AI784526, AW418919, AW277237, AI039256, AI734932, N20047, AA602108, AA906348, AW406898, AA480905, AA748764, AI708167, R01227, AA641971, AI970640, AA521187, N92776, N25677, AA765180, AW014251, AA809901, AA476626, AA732578, AI751105, AA341059, N34097, AI086671, AA312978, AI696079, AA928247, W25524, R81082, AW119206, H43996, AW117721, AW405044, AI813973, AW005026, AA490590, AW139747, AA074480, AI383401, AI292298, AA807336, R78198, AA704947, AI263119, H43433, AA737427, AA811989, AA810744, AA167018, AI285699, H84090, AA676862, AA018129, AI806914, W19267, W19342, AW407878, H02400, AI766614, AA975459, R80972, AI921449, H42547, AI377900, H84091, R82713, AW275577, AI222553, D20178, AA491236, AA152125, AA725290, AI784459, AA491229, AW449400, AL121463, W81357, AA766645, H42546, AA721265, H22250, AA837071, C18400, R48013, D79301, AI867841, AA641916, N87578, H27095, AA156816, AA810117, R84879, AA151369, R77825, AA385592, R47909, AA449155, AI337517, R23498, N45609, AI220842, AA808364, AA345758, AA331682, W23568, H43997, AA622355, AA736770, AA150043, AI651562, W79656, AA807032, AA210800, AA211896, AA488952, AA165612, R34375, AI783841, AA805302, R34495, R01340, R80959, N42538, AA256635, N29202, AW235268, AA371039, AA074479, AA256716, AA044802, AA018130, AA806391, AW407489, C01426, AA889990, R28134, AA094806, AA091907, AA746101, D19898, AA480968, AF151834, U93243, and AF161502.
HMAJL09	345	1157337	1 - 581	15 - 595	AR007575, I18860, I18861, I55990, and I55991.
HSVCH37	346	558195	1 - 236	15 - 250	AB001632, I58533, I58528, AB015656, I58538, AJ004865, AF043731, D89094, L16545, and I58526.
HTOCG37	347	708888	1 - 339	15 - 353	AA190710, and AF079529.
HBXAW47	348	771624	1 - 668	15 - 682	AA028190, AI953574, AI738595, AA595667, AI221343, AI968102, AA600319, AA992363, AI473733, AA551102, AI138415, AA121435,

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HBXAW27	349	909801	1 - 1816	15 - 1830	AL118753, AL118745, AA325952, T77115, R85173, AA984410, AA349408, R89744, R84547, F11722, AW374405, AA081372, AA338443, AW374437, H41707, R26621, R88015, AA985330, H38454, R88440, H38442, R88843, N94059, R88564, AB023167, J03137, M20636, L14323, U85712, U85714, U85713, AL137267, AL049632, AL050315, AP001501, and AP001501.
HSLJE54	350	926924	1 - 905	15 - 919	AA224020, AI909199, AI906604, AI906305, AF116547, AF116548, AF116545, X94152, M64755, AJ132661, E13557, AF116546, AF115343, and U74492.
HBXBG65	351	932780	1 - 521	15 - 535	R36281, AF094480, and AF094479.
HE8CG83	352	933609	1 - 1114	15 - 1128	R98819, H48501, AI431664, H48668, H48397, T89386, AB011178, and AB023624.
HOGCW55	353	953161	1 - 514	15 - 528	W25173, AA587912, AA353485, AA192483, AA463391, AA489306, H66607, T79491, T86627, AF113132, AL353594, and AL353594.
HNTND64	354	954871	1 - 392	15 - 406	AC025090, and AC025090.
HHAWC08	355	957942	1 - 1870	15 - 1884	AI860000, AI984180, AI052115, AW027098, AA507892, AI269682, AI860186, AA910656, AA911665, AI122607, AI982553, AI492064, AI148135, W56156, W60937, AA974459, AI419847, AA009421, N28887, AI673827, AI277360, AA740276, AA778158, AW250214, AA456771, AI034295, N35234, AW170157, N30305, AW247011, AW026104, H99254, AA654123, AA830800, AI141374, AI074187, W31386, AA524317, AI261816, AW403968, AA846516, N39743, AA480954, AI280981, W60872, AW073283, AA761349, AA683175, AI207047, AW236672, AW389139, AA009725, AW058117, AI073671, AI092406, AI085232, AI188288, AA113312, W15516, AA653970, AW352169, N95282, AA551600, W86394, AI084709, N78792, AI475205, N42029, N55379, AW001694, AI355933, AA181712, AA004431, N44897, H94052, AA699746, T48085, AA730615, AA112533, AA306422, AA342623,

					R38707, H80310, W38668, H06714, T51462, AW375770, H06763, AA302273, F13201, AA033586, H81887, W86393, AA687134, AI269924, AI933743, R89868, AA033585, AI863793, AA315202, R30828, AA772763, AA678198, AW375790, F10804, AW078473, N26380, H80311, AI159939, AI383032, AI300606, AI027171, AA310599, AA887439, AW403264, T75396, AA091936, R89830, N41533, AA810312, N77721, N58353, AI768718, R06623, W37176, H94132, R06681, AW449471, AA026195, AA026267, W24414, AA936706, AI033915, H81888, W07220, AA854111, AA826955, R79020, N43834, AW388723, N77385, N25010, AA879094, AA322203, AR009648, AL096870, AL096870, and AL096870.
HFEN04	356	964824	1 - 527	15 - 541	AA019175, and AC018984.
HTZMB51	357	496523	1 - 387	15 - 401	AC078913, and AC078913.
HNHDK43	358	529500	1 - 384	15 - 398	
HTTDP32	359	558751	1 - 412	15 - 426	AW205029, AW205044, D21851, and AC006515.
HSLEP27	360	572920	1 - 606	15 - 620	AC073692.
HMTAL73	361	621705	1 - 646	15 - 660	AA166733, AI830198, AI279140, AI609203, AA314053, AA522698, AI683664, AI566177, AI471673, AI301177, AI366138, AA189176, AA581780, AI880224, AW188413, AW247288, AI760872, AW167604, AA575851, W40145, AA554369, AA766702, AA167013, AA993092, AI952254, AA341921, AA550829, AI189562, AA341834, AA994485, AI807966, AW084516, AI367411, AW166426, AI289088, AW276556, AW409580, AW168027, AI313164, AI126744, AA062738, AI005192, AI346778, AI886479, AI266434, AI373206, AI890694, AA599846, AA621441, AA425361, AA889086, AI290386, AI018456, AI139395, AA878656, AI090131, H68937, AA661827, H68968, AA425567, AI359753, AI272100, AI928276, AA745814, AA861972, AI681292, AW365639, F28763, AI366352, AI301277, F21634, F35882, R42221, AA679837, H30364, D19608, AI372963, AI039668, AA099413, AA976445, R00632, F29067, AI086538, AI300790, H24962, F37091, F35686, R00531, AA962826, AW148420, C75054, H25002, AI024081, AA746315, AL050094, U49283, AF046929, AL049712, AF023266, AF090322, AF023265, X82632, AF090321, AF090323, and AF090324.
HMHQB53	362	715301	1 - 409	15 - 423	AA071216, AA399171, N28436, W37722,

					N34696, R47745, AA126615, N42988, H96178, R72207, Z42227, AW390760, AA595329, AA056310, AA017665, H50903, R84807, AA322022, AF135422, AC040991, AC040991, AC024009, AC024009, AC024009, and AC053503.
HBICG44	363	715860	1 - 391	15 - 405	AA812035, AA384254, AW072302, AI480195, AI885635, W72566, AA100912, W76560, AA877207, AI310696, AA781222, AW025204, AW025212, AA962214, AA923685, AI392859, AA576938, AA878505, AA872783, AI589503, AW403749, AA160087, H29768, AW005265, AI281977, AI339338, AI826904, AW248975, AW149620, AI356346, AI934471, AA058529, AW369482, AI352226, AA188326, AA974029, T60268, AA934427, AA480672, H38826, AI085778, AA773811, T68371, and D16294.
HSKXN70	364	753717	1 - 343	15 - 357	AA317681, and AC009320.
HPIAC32	365	815942	1 - 505	15 - 519	AC009960.
HHFFP57	366	835955	1 - 674	15 - 688	AW044463, W60505, W60589, R06820, R33763, T67154, AI819666, Z19472, AW138205, AI760947, AI766255, AA368618, AW242629, AI985540, AI479264, AA371505, AW194990, AA918910, AI913127, H91117, AI221898, AW418932, AI738505, AI092638, AI565356, AA903150, AW024878, H39065, AC005166, AC005161, and AC006392.
HFJKJW01	367	836491	1 - 426	15 - 440	
HSDFL63	368	836498	1 - 675	15 - 689	AA382259, AI205666, AB015228, AL110299, AL110274, AB015227, AB015226, X99273, U60063, AL137418, AC012653, AC012653, AC015474, AC015474, AC015579, and AC015579.
HLDOO08	369	857070	1 - 571	15 - 585	T63822.
HMSHN43	370	867363	1 - 452	15 - 466	AA126615, N28436, W37722, N42988, N34696, H96178, R72207, AA399171, R47745, Z42227, AA071216, AW390760, H50903, AA017665, AA056310, R84807, AA322022, AA595329, AA326931, AF135422, AC040991, AC040991, AC024009, AC024009, AC024009, and AC053503.
HBXCT92	371	871044	1 - 1611	15 - 1625	AI800599, AI937500, AI660531, AA703831, AI798535, AI143649, AI632282, W58368, W58049, W22190, AI040925, AA102365, AA991764, AA587233, AI637675, AW177485, T78051, AW177468, AW177486, AA580025, AW177474, AW177465, AW177481, AW177466, R38705, AW177478, T90276, AW177472, AW177490, T82858, Z45650, AW177482, AA507077, AI359536, AW351990,

					Z24924, Z41323, AW351996, T75394, AA649500, AW177467, AW177484, AA322492, AI700227, F01614, AW177480, F00408, AA582198, AA905387, F31617, AW362684, AW177464, AA102364, AW365594, F05355, AW178432, C21034, F34596, AI970443, AA308943, and U38253.
H6EDP44	372	875744	1 - 976	15 - 990	AA573876, AI591002, AI832260, AI671469, AA744779, AF135421, Z66459, AC024888, and AC024888.
HLJBF94	373	875745	1 - 656	15 - 670	AF135421, and Z66459.
HTEHO28	374	877182	1 - 2209	15 - 2223	AI818600, AI247566, AI990846, AI247565, AI656342, AI034180, AI564798, AI263858, AI631389, AI363409, AI277926, AI248361, AW302269, AI949807, AA460989, AI242750, AI167441, AA910017, AA311916, AA707475, AA053363, AA702834, AW194767, R07745, R48470, AA374891, R48471, R07744, AI015726, AA948314, H99544, AI499115, AI565996, AW138866, AW070902, AI767271, H85099, AI420312, H80005, AA885289, AF133519, and AF171055.
HE9PC30	375	880696	1 - 1585	15 - 1599	AW444920, AI128490, AI991629, AI671520, AA631316, AI017930, AI798116, AA724644, AI927358, AI689872, AA574142, AA614686, AI806219, AI014617, AI970650, AI784526, AA478628, AI984819, AA772221, AA165612, N92776, AA488873, AA490739, AA837071, AI970640, AA831431, AA767225, AA491236, AW296841, AA480905, AA748764, AA765180, AA809901, AA521187, AA490749, AW139747, W19342, AA490784, AA732578, H42547, N64079, AA731475, AA928247, AA258932, AA737427, AA258818, AA807336, AA811989, AA490590, H84091, W19267, AI377900, AA165621, AW407878, W81357, R80972, AA491229, AW449400, AA766645, W19430, AA725290, H22250, R47909, AA156816, AA810117, AI867841, AA641916, AI337517, H43997, AA736770, AA808364, AA151369, AA805302, AA211896, C18400, R80959, AA371039, AA807032, AA018130, AA806391, AA889990, AA641971, N34097, N34063, AA091907, AI751105, AA480968, AA341059, AA648868, AA918628, AA714856, R01340, D82419, AF151834, AF161502, and U93243.
HLMDN29	376	881288	1 - 495	15 - 509	AP002520, AC023532, AC023532, AC023532, and AP001447.
HWBCF78	377	911355	1 - 446	15 - 460	X97650, and X70400.

HUKEN49	378	911465	1 - 513	15 - 527	AW361145, AA159854, W20422, AA161059, N54761, AA161002, AW385193, AI905632, W31874, AL133017, and AC023133.
HCUDS02	379	914401	1 - 1536	15 - 1550	AI659646, AI088615, AI871104, AI086630, AW084577, AI589869, AI809420, AI475555, AI972159, AI041028, AI023862, AA126615, AI560283, AI620853, AA126488, AI160486, AW339453, AA394146, AI950891, N42988, AA531289, AI240938, AA664348, AI092342, AA017665, AA056310, AI832557, AI359609, AA016273, AI422275, AI753785, AI969085, AA056205, AA569043, AL134103, AI374670, AI041533, AW379940, AA622636, AA524028, N27414, W37722, N28436, AI203196, W60573, W37723, AW390760, H41077, R84807, AA071445, R72207, N34696, AI935373, AA535307, W60664, AA595329, AI679775, AI354402, AI866325, AI453011, R59044, AI493743, H50903, AA326931, AA378229, AI656225, AA335411, AA399171, H96178, AA322022, R47745, H96179, AI341612, R70801, AI869130, AA010446, Z42227, AI524531, AW079482, Z38472, AA071216, AI970500, AW380313, AI857282, N46401, AA335607, N33327, R97069, AI086631, AA018645, AA059012, AI473953, AA377686, AF135422, AC040991, and AC040991.
HTTJU40	380	914402	1 - 482	15 - 496	AA017665, AA056310, AA378229, AA326931, AA126615, N42988, R84807, AW390760, N46401, AA322022, H50903, N28436, R59044, AI493743, R72207, N34696, AF135422, AC040991, and AC040991.
HFXJX41	381	915649	1 - 669	15 - 683	L34002, and AC034250.
HSLCK91	382	915650	1 - 387	15 - 401	AC074333.
HSLAO29	383	917349	1 - 523	15 - 537	AW411276, AW411540, AW411154, AW411486, AW248301, AW410935, AW410456, AW410459, AW410723, AW410388, AW410636, AW250477, AW410441, AW250287, AW410516, AW246316, AW410323, T74720, AW250611, AA171436, AA179614, F12758, AW411158, AW410722, AA348084, AW410275, H96758, AA323383, AA233215, AA328132, AW410237, AA356005, AA219520, AW411491, AW247727, AA102177, AA243309, N87314, U23143, X91902, L11932, Z62251, and Y12331.
HRDBJ38	384	917583	1 - 1854	15 - 1868	AI201634, AW206017, AA496215, AW237206, AI652106, AI147505, AA447906, AI338723, AI493188,

					AA196044, AA496216, AA581805, AA011198, AA011053, AA428183, AI433779, AA115500, AA115028, AA428394, N92785, AI073345, AA010801, AA553670, AI343410, AI814185, AA583159, W20514, AW002014, AA719860, AI800294, U53093, AW072769, AA995007, AA195789, AW387762, AI282057, AI659096, AI828007, H27138, W99384, AA722547, AA055124, AW338524, AA055044, AA055075, AA362890, AI445319, AA496217, AW130260, AA010773, AW084356, AI636404, AI701197, C03492, AA463574, F32683, AA055135, AW339018, AI682634, AA451938, AL046931, AW190297, AI567971, AI613144, AL047344, AI952217, AL038076, AI207454, AW150578, AW088145, AW020358, AI685211, AL038529, AI670984, AA481033, AI367203, AI349246, AW148865, AA176980, AI250627, AI873752, AI364620, AI287476, AF017152, AL137529, X51694, AL080231, AL137294, AF019298, AL096751, I89944, AF030635, AF079763, AF153340, AL133075, AL133637, S77771, AL133568, E08516, X70685, X72624, AL137259, I46765, AL133112, AF089818, AJ003118, AL122098, U75932, AL122050, AL122111, AL110296, X92070, A12297, AL137662, AF085809, AL137539, AL133636, AL049465, S78453, AL137523, X80340, E12580, AF125949, AB026128, S61953, AL080086, AF031903, AL137283, A47363, AF200416, AJ242859, I17767, AL133113, and AF057300.
HOUES64	385	918119	1 - 304	15 - 318	
HWLHU02	386	918520	1 - 589	15 - 603	AW451101, AI380194, AW450222, AI393033, W22012, AA152163, AI380397, AC027617, and AC027617.
HEAHA84	387	919363	1 - 1903	15 - 1917	AW382182, AI902876, H14269, AA069213, AI902670, AI902671, AI554050, AA832004, AI751613, AA808661, AI902672, AA252385, AA027143, AI418553, AA147428, N91972, AW374017, AI146668, AI339191, AA953704, AA996174, AI092938, AA826792, AA584264, AA995593, AA282039, AI140031, AA742515, AI187137, AW006944, AI333234, AI370584, AA807417, N76058, AA555194, AA071511, AA705743, AA229404, W51757, AI146915, AI216545, AA236960, AI357217, F30411, AI371338, AA610574, AA639822, W19829, W58451, R08131, N68046, AI023042, F27897, AA758142,

					T96941, AW270555, N59651, W52002, AA284884, AI022462, AA284615, AI250701, AI312520, N78659, AA026962, N70547, AI290890, AI566950, W76586, AW005072, W95678, W04465, AI274885, AA026455, AI860334, AI051085, AA026399, AI342191, AI346713, W05408, AI088659, AI090805, W15148, AI147701, AA236774, AA910393, AA804750, AA282382, AI570650, AI924762, AA149268, AA491249, AW117991, AI422705, AA046848, AA046810, AI031903, W72433, AI023043, AA083509, R07181, AW382267, AA574096, AA134304, AW074946, AA736750, N90580, AI282318, AW245981, AW245537, AI277699, AI420748, AI735260, R07208, AI880658, AI143585, AI051142, AA887653, AI268051, AI709253, N91924, R11231, AA742573, AI026809, AA280277, AA877021, AI708293, AI708235, AA777052, N32046, AI619984, AI282753, AA527394, H54880, AI364309, AA129245, AI889861, AI290693, AA452484, T39397, W58486, AW074077, T80989, N57907, AA642592, AA643025, T97344, AA247232, AI880663, AA316267, W00810, F28809, AA324010, AA127148, AA134303, AA151350, AB018270, AC002119, X71997, AF161448, AF077202, AL031729, and Z82206.
HBMXQ90	388	922114	1 - 449	15 - 463	AA149171, AI984559, AA934684, AA503779, AA808602, AA570036, AW073912, AA973597, AA704134, AA374289, AA832230, AA651931, AI826677, AA102091, AA149172, AA715137, W44955, AI984459, AI263829, AI377362, AA099896, AI471344, and AC024247.
HOEJV72	389	930778	1 - 833	15 - 847	AI378980, AA354580, AW401983, W24109, AF153191, Z99758, and AF202048.
HRDBH58	390	933364	1 - 2621	15 - 2635	AI863355, AI863364, AI674922, AI754389, AI056058, AW295190, AI623178, AW131720, AI949042, AI056059, AA356949, AI668970, AA620354, and AA159456.
HCE3E13	391	951413	1 - 677	15 - 691	AC004211, AB023048, AP000511, AC005937, AB023048, AB023048, AC004211, and AC004211.
HUKFO68	392	951652	1 - 1166	15 - 1180	AW194769, AW271679, AI949849, AI339520, AI492487, W81116, AI457416, AA702464, AI309557, AI278874, N69263, W87406, AW300667, W78764, AA494373, R11650, W00816, H90588, AA150009, AA877626, AI559893, R10051, AI470605, H90495, AA309160, AI473983, AI473532,

					AC027617, and AC027617.
HFXJW08	393	959204	1 - 676	15 - 690	AC026761, AC026761, and AC009091.
HBTA04	394	407351	1 - 477	15 - 491	A31765, and A31767.
HE8FG51	395	465267	1 - 527	15 - 541	AA393505, AI024045, AA398573, AA309852, and AA399121.
HTPDU31	396	503077	1 - 352	15 - 366	R20319, AA322955, and Z83844.
HMUBV12	397	549423	1 - 352	15 - 366	AA085250, AF040710, AF036035, U73167, and U90094.
HMHBS90	398	574062	1 - 604	15 - 618	AW381702, AW381701, AA677535, AA223851, W67779, AA429201, AA770162, W23198, W85753, AW246223, T84043, H62758, AF113544, AC021059, AC055734, AC013626, and AC013626.
HLHGH34	399	575733	1 - 784	15 - 798	AI056280, N31314, AA399591, R95732, AA224343, AA399001, AL120264, AA699899, AJ223333, AF045888, and AF012128.
HELHC55	400	577384	1 - 202	15 - 216	AC016544, and AC051617.
HKAAZ66	401	592105	1 - 658	15 - 672	AL119973, AI751411, AA375863, W53027, AA159906, M23254, D38117, L09120, AF015038, Y10139, and J04700.
HHSCN33	402	657367	1 - 394	15 - 408	R87212, H15245, and AB002320.
HNGJQ15	403	660310	1 - 354	15 - 368	AF132607, AB006626, AC022705, and AC017028.
HDJME16	404	661396	1 - 474	15 - 488	AL046450, AA343865, and AF135440.
HNTNR64	405	670033	1 - 453	15 - 467	AW161063, AL161790, and AL161790.
HMICO24	406	677036	1 - 337	15 - 351	AA913929, AF123320, AP000350, AC010925, AC010925, and AC010925.
HSIAC23	407	679292	1 - 446	15 - 460	H14396, R19960, F11251, R12516, AA376792, AF095286, AF019638, and AB033084.
HSLFL74	408	685897	1 - 1332	15 - 1346	
HSDJD53	409	698259	1 - 611	15 - 625	
HCEBF33	410	702955	1 - 897	15 - 911	R20250, N57610, R20853, and AA321932.
HAPQW27	411	705518	1 - 419	15 - 433	T79494, H45923, AA430536, AW391923, AA453511, N76754, R99213, AA478000, R07932, AA635101, H24791, and AF059202.
HCFLZ28	412	707183	1 - 533	15 - 547	AA135288, AW245881, AW247020, AW250562, AA236737, AW246286, AA176210, AI972465, AA564581, AA380625, AA219293, AA054656, T73385, AW247374, AF110956, AF090385, AF161489, and AF046025.
HWCAB58	413	710377	1 - 436	15 - 450	AA340789, AC006059, AC006059, AC006059, AC006059, AC022064, AC022064, and AC022064.
HLMMC57	414	713770	1 - 520	15 - 534	W68048, AA864219, AW083109, AA719473, AI291666, AI241237, AW128951, AA676817, AA128261, F20824, AI248718, AI300073, N67989, AI421727, AI248154, AW079370, AI356839, AI280526, AI972420, AW166361, AA652925, W24384, H47029, AI312665, AA152319, AA121942, N69898, AW263672, AI245203, AI243886, AA070091, AI083558, AI242032,

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HMELH37	415	717556	1 - 546	15 - 560	AA412320, AA111940, AA026041, AA057628, AW327417, AA578622, AA304666, AA322871, AI364479, AA164328, AA053775, AA256056, W17025, AJ011307, AL050109, AF112207, AJ011305, AJ011306, X75451, Z48225, M98036, and M98035.
HNGJI55	416	722240	1 - 290	15 - 304	
HHGDG42	417	724795	1 - 346	15 - 360	W68048, AA676817, AI248718, AI356839, AI248154, F20824, AA719473, AI291666, AW079370, AA864219, AI421727, AI300073, AI972420, AI280526, AA128283, AW166361, AW128951, AA652925, N67989, AW083109, AI241237, AI312665, AA152319, N69898, AI243886, AA070091, AI245203, AW263672, AI083558, AA443449, AI242032, AW236290, AA121942, F33522, AW452471, AA128261, AA364904, AA953547, N95310, AA780205, AA746621, AA836940, T35526, AC007421, and AR060348.
HMTMF31	418	731302	1 - 412	15 - 426	AI908495, AI908497, H06611, Z44955, AA884619, AC022275, AC020632, and AC020632.
HSDIF59	419	739212	1 - 738	15 - 752	AC022123, and AC022123.
HNDAG60	420	751953	1 - 433	15 - 447	AI909320, AA211037, AL135260, AA308190, AL078644, AJ012449, AF161553, AB020657, AL356273, AL356273, AL356273, AL078644, and AL078644.
HSLDS79	421	753247	1 - 1643	15 - 1657	
HFBCQ61	422	769102	1 - 232	15 - 246	T05065, AC022886, and AC022886.
HRACD17	423	769103	1 - 372	15 - 386	AA195509, AA913929, AF123320, AP000350, AC010925, AC010925, and AC010925.
HLDQV23	424	788957	1 - 492	15 - 506	W67622, R15231, H29786, Z45968, AA134647, AW070475, H29341, R17825, Z44449, R18068, F08575, AA311176, AA338915, and AI091322.
HPHAF45	425	812327	1 - 372	15 - 386	AA086182, AF160757, AA332331, and AC006963.
HSUME31	426	812373	1 - 559	15 - 573	AA380193, AA805469, AW410817, AW205922, and AI341441.
HUSHB56	427	815819	1 - 400	15 - 414	
HTGDN81	428	824708	1 - 1730	15 - 1744	
HSKHY26	429	836598	1 - 558	15 - 572	Y08565, and AJ133523.
HKACD80	430	837698	1 - 681	15 - 695	AW239293, R67182, R57498, R38144, and

					AI525934.
HHFDK48	431	837782	1 - 615	15 - 629	U46280, and R20122.
HE9SS77	432	838043	1 - 712	15 - 726	AW192470, AI909676, AW452409, and AB029000.
HAPOK49	433	848205	1 - 2350	15 - 2364	AW167677, AA115266, AW367477, AA115290, AI479820, AI921740, AW264587, AI984188, AA921909, AI720535, AW009676, N52232, AW264571, AI288254, AI720091, AI469825, AI343723, AI340165, AI369205, AI540180, AA731094, AA284102, AA190585, AI130714, AI601156, AI318418, AI356057, AI285088, AA868295, AI222845, AA862416, AI125965, AA232911, AW376890, AW205479, AW367453, AW367505, AA627639, AI436765, AI001925, AW007969, AA587445, R89279, AA565341, AW028591, AI291010, AA151416, H61720, AA151435, AI220654, R89280, AW376858, AA416869, AW376856, AW367598, N57366, AA858414, F28955, AW377075, AI383330, AA933642, AW376981, AI280477, H61924, AA353824, F11283, N29431, AA626138, AI499314, AI174282, AA907328, AI280458, F17912, AA078177, AA078636, AI434747, F34447, N73199, AA357542, AI355066, AA723820, AI193175, AL043355, AW151136, AI269862, AI868931, AL119863, AI288305, AI364788, AI539153, AI473451, AI872423, AI272065, AI670009, AI624154, AL045500, AW301505, AL121014, AI815232, AI863382, AW071417, AI699865, AW023338, AI433157, AW268253, AW161156, AI494201, AL045163, AL045620, AW082113, AI654672, AW117743, AI684265, AI340627, AI457369, AI866820, AI889147, AI619502, AI433976, AI312428, AI620284, AI358701, AI802542, AI539771, AI340603, AI537677, AI500659, AL036631, AI587114, AI801325, AI500523, AI538850, AI800453, AI610362, AI284517, AI500706, AI564719, AI445237, AI491776, AW151138, AI564749, AI500662, AA715307, AI590120, AA809974, AI633493, AL049085, AI610645, AW074869, AI580674, AL039276, AW026882, AI630928, AI648684, AW303089, AW302965, AA640779, AL039086, AW411310, AW020693, AI349645, AA572758, AI433037, AI309401, AI955117, AW169671, AI343112, AW089572,

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HPMGN48	434	848318	1 - 949	15 - 963	AI446455, AW131349, N85000, AW188484, AI963263, AW072073, AC008686, AC008686, AC008686, AC017030, and AC017030.
HUVHP54	435	849278	1 - 1256	15 - 1270	AW360965, AI765501, AA112034, AW271852, AL036039, AA316041, AI951240, AA211024, AW188545, AL036038, R26717, R26941, AA317168, AI982523, and AI417583.
HSLDK59	436	853385	1 - 1662	15 - 1676	D62415, D79536, D62440, T03269, AI905856, AW178893, D58283, D59859, D80022, C14331, D80166, D80195, D80193, D59927, D51423, D59619, D80210, D51799, D80391, D80164, D59275, D80240, D80253, D80043, D59787, D80227, D59502, D81030, D80134, D80212, D80196, D80188, D80219, D59467, D80269, D57483, D80038, D80366, C14429, D50979, D59889, D50995, C15076, D59610,

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HMWDI41	437	854051	1 - 634	15 - 648	AA985190, AA283143, Z19146, AA371530, and AA371532.
HFVHU73	438	856165	1 - 359	15 - 373	
HMUBJ80	439	858497	1 - 592	15 - 606	AA286791, AI671208, AC004466, AL117455, AF207749, AF207748, AF006602, AC004466, and AC004466.
HE9ML74	440	859297	1 - 2102	15 - 2116	AI141536, AA716179, AI638212, AI769556, AI963758, AI761109, N24244, N49976, AI890512, AA888851, AI204229, AI492301, AI399665, AI684997, AA397545, AW452929, W58540, AI308244, AW167166, AI032858, AI990115, AI191763, AI687674, AI356174, AW237523, AW237513, W05191, AA825680, AI628442, AW051464, AI955375, AA446754,

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HLQAJ01	441	864092	1 - 362	15 - 376	AL133500.
HSLDP32	442	866241	1 - 477	15 - 491	
HPMEG40	443	866272	1 - 644	15 - 658	
HRADE27	444	867195	1 - 535	15 - 549	AA809467, N50856, and D87455.
HTXQR10	445	869137	1 - 553	15 - 567	AA308909, H39234, H86515, H86668, and AA053340.
HEQCB27	446	871062	1 - 414	15 - 428	
HE8AM04	447	871156	1 - 506	15 - 520	AA378845, AA332652, AA331633, AL031774, AL031774, AL031774, AL138825, AL138825, and AL138825.
HSLHT48	448	871996	1 - 832	15 - 846	AC024580, AC020865, and AC026761.
HS2SH70	449	875870	1 - 1002	15 - 1016	AI159768, AA311553, AA313233, AA336308, AI916593, F08346, AW269297, AA376331, AI651236, AI968341, AA374806, AI650685, AA781008, T99283, and AL133500.
HAOAE45	450	876157	1 - 460	15 - 474	AA214170, AA313857, and Z98048.
HELBA42	451	878549	1 - 1000	15 - 1014	R54355, AA311209, AA357633, AA471387, AL050269, AC016888, and AC016888.
HSPBB15	452	878791	1 - 943	15 - 957	AI741739, AI034449, AW167538, AW449121, AW450678, AI025866, AA052927, AA324019, AI914219, AW449405, H84106, H84348, AA954604, AA772473, AA862600, and X94769.
HTAFF91	453	879399	1 - 417	15 - 431	AL353658, AL353658, AL353658, AL121829, AL121829, and AL121829.
HETHB58	454	879640	1 - 2091	15 - 2105	AW137688, AI026819, AI755198, AI184220, AI628600, AI138494, AA719354, AI632957, AI654050, AI452505, AI745411, AI828312, AI954024, AI668845, AA135154, AI361008, AI968355, AI273657, AI457540, AI381674, AL041951, N50974, C18929, AA630633, D61531, R62626, AA621743, AI244542, R62679, AA781904,

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HGBCU40	455	880328	1 - 612	15 - 626	AA160076, and AA358669.
HE9PR39	456	882939	1 - 658	15 - 672	AA205757, and Y11342.
HTEAF36	457	839516	1 - 416	15 - 430	W58006, AI668926, W58089, AI831877, AA743829, AI686118, AL137970, C00300, AI084277, AA382444, and AP000500.
HTLGW66	458	883855	1 - 1071	15 - 1085	AA101045, AA327432, AL120125, AA064706, AB006626, and AF132607.
HPJDV95	459	888844	1 - 2242	15 - 2256	W87845, AA306733, AA436941, AA317242, W68443, AL043085, AI904583, AI904581, AA852968, AA055870, R18042, AA331908, R85004, AW374823, AA333573, AA496029, T60187, R67194, AB002315, AC007956, and AC007956.
HCROF75	460	889436	1 - 605	15 - 619	H50475, AW365306, H19076, AW005455, AI936813, H52856, AI889218, H46135, H21233, AI222424, AI761295, AW182628, AA808804, W31107, AI159900, AI678906, AI086009, N27033, AA134923, AI095908, AI040775, AI183540, AI040378, AI021891, AI086517, AA375766, AI274905, AA641834, AA862389, AA746211, and AI280044.
HDPAP15	461	909703	1 - 2166	15 - 2180	AW363530, AA769683, AW297818, AI686368, AI313505, W30752, AW402208, AI693613, AI339571, AI278375, AI768004, AA489015, AI796758, AA716376, AI082543, AA911940, AW051481, AA017455, AW449905, AI366820, AI221259, AI769222, AI696801, AI366823, AI272115, AA426161, AA489109, AI806229, AI863884, AW237823, H87695, AI183323, AI374867, AA282415, H43142, AW293509, AW173784, AA424867, AA935247, D80190, AI806408, AA225692, AA515396, AW149310, AW304299, H87188, AA419564, H86462, AI351454, AA259172, AI434313, H01784, D62871, AA295452, H42376, AI221615, H98189, AW242071, AI272114, R22945, T84810, AI674970, R72115, AA352436, AI291670, AA934569, AI371982, AA382970, H01035, AA282518, D59531, R23051, R08439, AA345737, T98710, AA368953, AA970076, AA661764, AI798755, AC009830, AC009830, AC009830, AL162427, AL162427, AL162427, AC027143, AC027143, AL137067, AL137067, and AL137067.
HTGDH34	462	896571	1 - 465	15 - 479	AA481051, AI094999, AL038641, N49766, AI564452, W72950, AI267675, W37899, AI267676, AI074405, AA806997, AI005357, AW337923, AA843699,

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HPDEH29	463	914591	1 - 1435	15 - 1449	AI935632, AA402720, AI709055, AW084124, AA627919, AI831270, AA402591, AI811503, AA644399, AI445401, AI471201, AA665605, AI888538, AW080451, F33042, AA534885, AI021955, T86794, AA468899, AI004832, AW167133, F01092, AA284738, AI583070, AI749970, AI749946, AI720993, R76005, AA385796, AW003861, AW337335, R09139, R09140, AA001985, T86699, AW374796, D45581, AW192120, AA367310, AC008655, AC008655, and AC008655.
HDPVG08	464	914973	1 - 2014	15 - 2028	AI627790, AI741400, W72452, AA778159, AA194722, AA805345, AI373857, AI204191, AI022197, AA195584, AI553921, AA195563, AA004370, AI037896, AA635921, AW271198, AA492510, AA194881, AW118173, AI394194, AI682195, W76301, AI057227, AL048308, AA304861, AI342429, AI096823, AA907944, AI091156, AW291961, AW173129, R46385, AI140762, AA417561, AI093670, AA704940, AW365963, AA129549, AA406087, AI123723, AA668599, AA953993, R73452, AA194960, AA136563, Z43870, T54090, AA411707, AA298099, T19123, H28868, AA460021, AA460001, Z39936, Z42582, AA969509, AA449930, AI351924, R21338, AW089362, AA004371, T54181, AA298160, AI689119, AA298004, R54735, AA482809, AW316904, AW342055,

					R57434, N86879, N56887, and AW078836.
HFXDW32	465	916095	1 - 873	15 - 887	AC074221.
HSSCY03	466	916445	1 - 2347	15 - 2361	AA858038, AI278444, AW166254, AI089805, AI077339, AA609667, AA610024, AA133632, R87843, AI199745, AA872570, AA825681, H03080, AA609687, AA135073, AI201686, AA633362, AI222648, R87365, AW005515, AA351230, C75670, R50048, W68513, H42549, H58008, AI301225, H42548, W68398, AI016159, AA358949, H44248, AW005743, AA632352, R48718, R87765, R85937, AW068671, AA001245, H03079, AI161348, AL119441, AW082316, C75560, AA133719, R53611, AA351229, R76433, AW188875, H15000, H51693, R17019, AA826431, AI039127, AI906284, AA811218, AA505814, and AA323280.
HFXFI49	467	916758	1 - 868	15 - 882	
HTLGH72	468	917526	1 - 1379	15 - 1393	AI972354, AI096541, AI423387, AA609519, AI927862, AW195104, AI823615, AI288221, AI807180, AA316295, AI640600, AI261219, AI469049, AW058491, AI018335, AI769865, AI915835, AW271578, AW020817, H08156, AI453623, AI123197, AI253074, AI521750, Z39699, AA947467, AW292014, AW272325, AI935784, AI439135, AW299954, AI860941, AA401192, R55759, AI384091, AA095581, AI470610, AI436596, AA749110, F06683, AA442605, AI767624, Z20396, H08256, R55838, AI498302, AI133156, D38736, AJ242973, U37150, and A74814.
HSUAE63	469	917758	1 - 2420	15 - 2434	AI609524, AW250309, AI246301, AW406806, AI475247, AW408563, AA307223, AA180537, AA121585, AA191172, W90183, AA349824, AA644643, AW245693, AA864530, AA100539, AA722494, AA190357, AW444911, AI902972, AI341712, AA552157, AA468624, AA375634, AA182594, AA653173, AA730865, AA353210, AA189069, AA669478, AI907834, AI473851, AA662700, AI354243, AA570632, AA182569, AA100540, T16427, and AA179752.
HAPTQ56	470	918920	1 - 1388	15 - 1402	AI253192, AI913253, AI597595, AA713495, AA972065, AA135967, AI928486, AA621901, AI261821, N87925, AA767100, AA427998, AW375405, C14331, AA514186, D80188, D58283, D59275, AW366296, D57483, D80253, D80166, C14014, D51060, D80024, AA305409, C14389, D59859, D80043, D80366, D51799, D80248, D51423,

					D59619, D80210, D80240, D50979, D81030, C14429, D80212, D80022, D80219, D80195, D59467, D80391, D80164, D59610, D59787, D80227, AA305578, D59502, D80133, D80522, D81026, D80269, D59889, D80196, D51022, D80268, D50995, D59927, D80251, C15076, D80038, D80439, D80193, D80045, D80241, AA514188, AW360811, D80378, AW177440, D80247, D80302, AW178893, D59373, AW377671, AA809122, C75259, AI557751, AI905856, T03269, T48593, C05695, AW178906, AW179328, D51103, AW360844, D51759, AW360817, D80157, AW375406, AW378534, AW179332, AW377672, AW179023, AW178905, AW378532, AW177501, AW177511, AW352171, AW377676, AW178983, AW352170, AW177731, AW178907, AW378528, AW178762, AW179019, AW179024, AW352117, AW176467, D51250, D80134, AW360841, AW177505, D80132, C14407, D58253, AW179020, AW178775, AW178909, AW177456, AW179329, AI535686, AW178980, AW178914, AW177733, AW178908, AW178754, AW179018, AW352158, D52291, AW367967, AW369651, D59653, C06015, AW360834, AW178774, AW352120, AW179004, D45260, AW179012, AW352163, AW378525, D51079, F13647, D80949, AW378543, D59627, C14344, AW177728, D80258, H67854, AW179009, AW178911, AW177722, AW367950, AI910186, AW378540, D80168, AW352174, C03092, D80064, H67866, AW178781, C14298, C14227, D59503, T11417, AI525923, C14957, D59317, D58101, D81111, AW177734, AI525917, D58246, AW178986, D59474, Z21582, D51221, AA514184, D80228, T03116, AW177508, AW177723, D80014, AI525920, C14973, AI525912, AW378533, AW177497, D60010, D51213, D45273, AI525235, D59551, AI525227, D51097, C14046, D60214, AI557774, N66429, T03048, AI525215, C16955, AI525242, AA285331, AW378542, AI535959, AI525925, AI525222, AW378539, AI525237, C05763, Z33452, T02974, AW360855, I25810, X99477, A62298, A84916, A62300, A82595, AR018138, Y17188, AJ132110, AB028859, AR008278, AF058696, AR016808, A30438, Y17187, A94995, AR060385, X82626, AB002449, X67155, D26022, Y12724, A25909, AR016514, A67220, D89785, A78862,
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HNFI54	471	919034	1 - 640	15 - 654	A87678, and A87679.
HSDF02	472	920435	1 - 439	15 - 453	
HE8NS06	473	921076	1 - 2033	15 - 2047	AL135389, N39522, AI276138, AA411650, R98806, AA411649, AI042194, AI337108, AA054180, AA195591, T85097, T91419, N75694, H62591, AA194887, T91333, H48536, H38810, N74637, AI083552, T84163, T07150, H62525, AI735438, AI735446, AA766914, H74206, N27321, AA743618, R27509, AW340758, AL119233, and U57317.
HASBA77	474	921365	1 - 491	15 - 505	N31364, AI621052, AI769770, AW450861, AI949556, AL038600, AI745266, AA693948, AW007238, AI656830, AI949554, AI278155, AI082864, AI697566, AI276252, AA868983, N75642, AI262986, AI991987, W92774, AW166436, AI097203, R06709, W92876, AW292727, AI939449, AI421460, and R06710.
HSKDP26	475	921831	1 - 484	15 - 498	H86371.
HMTAY52	476	921948	1 - 1080	15 - 1094	R96413, AA128507, and AA317716.
HSDJG01	477	922453	1 - 1113	15 - 1127	AA555023, AA813457, AA909776, AA869005, AI139751, AI336946, AI217452, AI952680, C74997, AI201128, R59507, AA905126, AA075057, AI301766, AW003911, T53623, R42081, AI383369, R55155, AA937192, AB027289, AC004919, AC006978, and AI269614.
HHEPF30	478	928000	1 - 3573	15 - 3587	AI743864, AW300442, AI591385, AI478201, AI582609, AA452009, AW290877, AA451621, AA434546, AW271285, AW383863, AA442095, AI806128, AI480423, AA608829, AA034199, AI862157, AI131164, AW029491, AA682451, AW044224, AI057300, AA677424, AA442206, AA441995, AI472204, AI446604, AI457332, AI199799, AI753877, AI208374, AI824310, AI094191, H58012, H90975, AI198069, AW369317, AW369300, C18321, AI702911, AW263671, AI281017, H91763, AI446442, D62486, D56548, R82655, H57920,

					R82704, AA703450, AA362040, H90318, C16180, R32593, D58519, Z28521, R32487, D62781, D42055, U96635, D85414, U50842, AJ000085, and AC021529.
HTLAB16	479	929948	1 - 1219	15 - 1233	AI743990, AI589677, AW117688, AA418209, AA293017, AA393552, AI671530, AA969969, AA868456, H05646, AA836313, AW263156, R34733, AW206863, R72891, H06920, AI638884, Z38689, AA280165, AA552211, H05647, AI424304, AI399693, AI685889, R49606, Z42496, AA566051, AW237268, AA400796, AI468780, AA621751, D60125, AW237328, AA651719, AA280537, AA628052, AI621125, AI365113, AI590631, R73367, AW370133, AC006171, and AL161645.
HOHCW42	480	930431	1 - 2705	15 - 2719	AL043762, AW374309, AI949368, AL047031, AI332936, AI753437, AL043761, AI082843, AI312951, AA596042, N66287, AA581864, AI337817, AI299957, AW176442, AA765272, AW151047, AA291256, AI204155, AI554941, AA284827, W21878, AW086203, AA284599, W32883, AA483805, AW080656, AI940303, D20050, AW236117, AI682915, AI800557, AI681601, AA832340, AI434035, AI640406, R18659, AA814818, D56944, AI909818, AW007421, AA768400, R41617, AI207292, H75906, AA344824, AW176252, AA349027, AA621492, AA308412, AA256261, AA281377, N44874, D56639, W56903, AI909816, AA502707, N57000, AW008679, N54314, AA626136, T28028, H75770, W32882, AI474693, W03296, N93433, H73523, W21476, N69401, H73120, AW367173, W92106, AW176422, N69534, W91977, AA725537, AA769874, N91429, AA016014, D13635, and AC004975.
HCHNX75	481	931615	1 - 782	15 - 796	AI741581, AI740580, AI751819, H23375, AA447023, W07434, and AW384800.
HBCBA92	482	933093	1 - 1344	15 - 1358	AI669658, W37286, AA622993, AA889998, AA652524, AI951241, AI683166, AI190493, AI034155, AW134760, Z40556, W37799, AA582929, F07091, T34272, F03366, AI652867, AI633848, AW003296, AW237222, AA903642, AI018678, R74239, R73148, AA633426, T31774, AA654034, AA228976, AA650139, AA654185, Z44729, AA312286, R45964, AA230048, AA535847, R19584, AI969818, H55437, AI565509, T16398, H55442, R53774, H55243, AA779609, N40124, N42225, W44890, Z93241, AL022316, and

					AF151854.
HHFJ131	483	933110	1 - 596	15 - 610	AA227572, AA251468, AA295399, AA332220, AI672033, and AJ242739.
HTXNN68	484	933670	1 - 951	15 - 965	AA147402, AA287304, AA905465, AI362039, N32677, and D86967.
HWFWO 6	485	933671	1 - 880	15 - 894	AA287304, AI418151, AA885205, N32677, AI630898, AA147402, AI362039, AW075796, AA905465, AL134533, AW392670, AL134531, AI142139, AL119418, AL119483, AL119319, AL119443, AL119324, AL119522, U46350, AL119457, AL134920, AW372827, AW363220, AL119484, AL119391, AL134538, AL134902, AL119341, Z99396, AW384394, AL119497, AL119363, AL119355, AL119396, AL119496, D86967, AR069079, AB026436, AR066494, AR060234, and A81671.
HE2SY77	486	934771	1 - 325	15 - 339	AC010552, AC010552, and AC008826.
HSHCO49	487	934819	1 - 752	15 - 766	Z43941, AI741147, AW419292, and AI200487.
HMUBI13	488	937820	1 - 970	15 - 984	AW160967, AA211700, AI341467, AI279873, AW161216, AW303833, AA428676, N39835, AI815401, AI815782, AI608966, H09215, AW162570, AW161752, AI357796, F08612, AA053621, AI309740, AI081095, AA359671, AI866956, N26682, AA428187, AI083998, AI083946, AA431956, AA928901, H09158, AL031722, AL132867, AL132867, AL132867, AL031722, AL031722, AL031722, AC012180, and AC012180.
HBXGL55	489	938766	1 - 2567	15 - 2581	AW192663, AI813485, AI467996, AW249671, AI823988, AI094671, AI336340, AW245209, AI338167, AI452800, AA312449, AI912974, AW136571, AI761673, AI859055, AI922047, AI151471, AI871294, AI565644, AI818821, AA858063, AI097651, AI910845, AA767239, AI498921, W56896, AI086438, AA255783, AI744679, AI921953, N38751, AI807705, AI339666, AI860241, AI470016, AI261514, AI084861, AI951827, AI273326, AA456816, AI083921, AA026234, AA256005, AA427873, AA975841, AW044122, AI475887, AW025647, H30863, AI128881, AA026233, AI312865, AA213700, AI369770, AA028002, H94766, AA193228, AA642716, AA999983, AA504815, AA213665, N48386, AI262677, AI240885, H38321, AA350441, R73806, H94734, AI193895, AI864868, AI912007, H38289, AA603355, AI197899, AI372820, AW183825, AI768797, AA377943,

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HAFAH26	490	940254	1 - 1750	15 - 1764	AA843300, AI911560, AI523785, AW237499, AI745296, AW085198, AI281417, AI276690, AW451214, AA488829, AA548082, AA296843, AI500123, AA296947, AC013708, AC013708, AC013708, AL157762, AL157762, AL157762, AL353192, AL354985, and AL354985.
HARMG23	491	942860	1 - 983	15 - 997	AI953875, AI680404, AI590551, AI082560, AI084107, AI243212, AA456171, AI473813, AA279972, AI339075, AI078761, AW418909, AI245568, AA443105, AI274709, AW243617, AA593768, T78012, AW139270, AA298137, AW244160, AA318651, AA630836, T78174, AI198099, AI934002, AI392724, AI141198, AI920782, AI341327, AW079432, AI366959, AI345261, AI494201, AI499621, AI916720, AI344935, AI345397, AI868157, H89138, AI627692, AI349814, AI889168, AI366968, AI799681, AI811192, AI345005, AI868180, AA420722, AI471909, AI345014, AW022494, AW020288, AI540606, AW022542, AI348917, AW151138, AA719383, AA417278, AI349245, AI307736, AI817584, AI273856, AI349186, AW149849, AW302992, AI690472, AA719238, N75771, AI934295, AW103608, N71180, AI340627, Y12860, AL035458, S77771, X95876, AR068466, AL050208, E08631, AP000083, E12580, AL133624, AC006197, X70685, X72624, U58996, E07108, AL133644, E04257, AF016271, AL110159, AF100781, AF022813, AL080158, AL136842, AL110225, AR005011, AL117394, E02253, AC006039, AF102166, A70386, AB026128, AF051325, I61429, L40363, S53987, AL133031, AL133054, X62580, AL133077, Y08616, U91329, AC006112, E08516, AL133067, I17767, AR068751, U57715, AF054599, AL137656, L13297, AL137283, AF035321, AF176651, AF120268, AJ242859, AL117585, AL133057, AF000301, Y17607, AF077051, Y11435, S75997, AF003737, AL122050, AL137640, AF107847, U67328, I46765, AF068615, AF017790, S73498, AF118558, AF036268, A47363, X99717, U31501, and AF114168.
HOFMV44	492	943224	1 - 1342	15 - 1356	AA459463, AI219490, AA705318,

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HE9CJ28	493	949245	1 - 3143	15 - 3157	AI570379, AI559155, AA904265, AI632377, AI908495, AI803264, AI128085, AA907767, AA045139, AW452815, AI539836, AA683030, H06611, AI651364, AA214647, AA443367, Z44955, AA902992, AI908497, AA532742, AW169967, AA433980, AW183446, AA884619, AA255657, AA348650, AA252141, T10439, AA324294, AA194914, and AI652350.
HE8AZ89	494	950713	1 - 703	15 - 717	AA332152, AA356092, F07677, AA204763, N89342, AA309660, A98668, and AL033527.
HFXKW94	495	950717	1 - 2202	15 - 2216	D62415, D79536, D79530, and D62440.
HISAF41	496	951370	1 - 1667	15 - 1681	AW028517, AW188277, AI264031, AI817388, AA648782, AI453043, AI017500, AI830660, AI263621, AA449636, AI631311, AA259158, AA904879, AI492449, AW294250, AA013250, AW439941, AA172063, AI453475, AI015722, D62609, R39884, AI300234, H07929, AW189712, AA172012, N71710, AI424714, AA312583, and AI243139.
HDPJH11	497	951371	1 - 534	15 - 548	H08035, R13587, H11806, AA214724, AC024667, and AC024667.
HLHCP93	498	950792	1 - 612	15 - 626	AI264031, AW188277, AA013250, AW439941, AW189712, AI453475, AW294250, R39884, AA648782, AI017500, H07929, AI631311, AI015722, AI830660, AI453043, AI817388, AA904879, AI300234, AI424714, AI263621, and AA172012.
HAIBC14	499	951671	1 - 3596	15 - 3610	AW377176, AA972730, AI809379, AL120784, AW195389, AA307786, AA528659, AI937352, AI880253, AI436287, AI955738, AA160707, AW190733, AI675853, AI347932, AW088724, AA406629, AW341945, AA806444, N63013, AI811945, AI093361, AA918621, AI634596, AW167801, AA827879, AI473850, W93520, AI610598, AW303898, W72035, AW071039, AI005090, AW206653, N20593, AI681096, AI653586, AI298699, AI554302, AI168500, AI161334, AW001775, AI671941, AW377175, R70985, AA974926, AW003410, AA159500, AW296599, AI671930, AI479155, W45020, N39629, AA446783, AW408030, AW241246, AA843265, AI342257, AA218731, AA854754, AI373434, AI435637, AI926612, AW392798, AA400556, W76428, N46440, N33401, AA315533, AW449175, AA218608,

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HKAJZ24	500	951676	1 - 813	15 - 827	AA373809, AF154107, AJ245539, and AF049344.
HWADY95	501	951731	1 - 1139	15 - 1153	AA609488, AA088826, AW301835, AI308020, AI860966, H91018, R01524, H82667, C20981, AA134268, AA878213, AA694197, AW274164, AA088689, AA133904, AI285166, AA133903, AA302740, F26419, AA582580, AA971908, F35821, H90906, AC012467, AC012467, and AC068426.
HCHAG27	502	952058	1 - 1086	15 - 1100	AA464030, AA434281, AA410674, AI860751, AI628190, AA568168, AI653151, AI097605, AI199027, AI200649, AI199599, AI935345, AI699991, AA227411, AI475176, AA525327, AI910441, AI923458, AI247190, AI687257, AI923451, D78694, AI541551, AW438934, AA225358, and D78920.
HPCRA07	503	952124	1 - 916	15 - 930	AW409918, AA555102, AL043031, AI003522, AA630416, AI948578, AW337170, AW167070, AW273765, AA594053, AI569275, AI687711, AI831256, AW305101, AW273196, AI720563, AA496831, AA862433, AI138558, AA948345, AI937816,

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HDMAF23	504	952729	1 - 1269	15 - 1283	AW015516, AI743962, AW140107, AI628524, AW024995, AI017297, AI623829, AA806834, AI984485, AA625702, AW001987, AA310600, AI039990, W16685, AI859903, AA768302, AW243684, AA021442, AI168281, AI476604, AW024181, AI200902, AW028166, AI291914, H40694, AW020685, AA651989, AW150558, AA643030, Z25027, AW130816, TS2555, R22742, AI916133, AI925910, AI028390, AI698415, AI144268, AA358576, AW072945, AI985596, Z28729, AI871674, AA027038, AA837399, AW023991, AA828132, AI631839, AA393701, D61435, AA400792, D60037, and AI089761.
HRGBU12	505	952730	1 - 589	15 - 603	Z28729, D61435, and D60037.
HADFD82	506	953295	1 - 991	15 - 1005	AL022328, AL022328, AL022328, and AL022328.
HCGAF54	507	954048	1 - 1550	15 - 1564	AI110617, AI310511, AI744260, AI952038, AW384588, AW384681, AA534627, AW373580, AW384656, AW384584, AW384669, AW384587, AW384878, AW373081, AW384893, AW372685, AA888950, AA811239, AA291003, AA773172, AA449969, AW292840, AI092253, AI340206, AW078875, N20250, AW372724, N53246, AA451774, AA740814, AI560204, AI469518, AA480600, AA907538, W95198, T73212, AW373094, N29313, AA314497, AA284356, AA026034, AI015667, AI075156, AA860363, AW384894, AA284355, T93793, AI761575, AA316090, AA780130, W94763, AA868850, AW386231, AA740256, AI269218, N99933, AW386224, W61201, H25602, AI352095, AW384679, AW384663, W90613, AW373101, AA971258, AA338101, AI266483, AA912213, W61153, AA004896, AA025388, AA301666,

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HSLGA19	508	610031	1 - 2173	15 - 2187	
HWCL36	509	955759	1 - 838	15 - 852	AA040207, AA366219, AI766284, AI692491, AI367785, N46691, N41339, AA040206, AI094304, AA934917, AW339438, AI952460, AW241835, AA775514, and AA437029.
HDTEN41	510	955895	1 - 2005	15 - 2019	AW025299, AI738561, AI887436, AI597937, AI659244, AA610471, AA577623, AI871132, AW003423, AW206281, AI469787, AI929613, AA307643, AI139100, AI971126, AI433850, AW138479, AI214111, AW376450, AI631735, AI201766, AI564773, AI950054, W21995, AA580302, AA535708, AA527978, AW206673, AI658647, AW304348, AI570461, AI792729, AA961619, AI050035, AI970862, AW235805, AW273183, AI199699, F28588, AI202307, AA513389, AI657141, AI587645, AA192875, AW002117, AI632770, AI445048, F32325, AI758993, AA192151, AL049004, AI799834, AI686535, F20196, AI619825, AI985536, AA635919, AI373415, AI658905, AA908566, AI689347, AA302933, AA302932, AI859697, AA886019, T91271, F00429, AA247984, AI366720, AW440352, AA704816, AI858337, AW136404, AW183291, AW074318, AW131087, AI161148, AI873174, AI267733, AI817104, AL135103, D50922, and AB020063.
HSDDD20	511	956046	1 - 903	15 - 917	
HDPBL08	512	959377	1 - 966	15 - 980	H95481, AW163324, AF012357, N41994, AA300013, W22836, AA299843, AA405520, AI332310, AI217156, AA962196, AI792193, and AC007938.
HMELJ75	513	960354	1 - 1238	15 - 1252	AA258943, W56172, AI074113, AA357755, AA366212, AA300574, AI383100, AA248900, AA299098, AI125240, AI620543, AA053503, W19899, AA312954, AF151805, and Z84478.
HLTCU08	514	960951	1 - 673	15 - 687	N29196, U69560, T71396, R79136,

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HTOHK41	515	960955	1 - 1052	15 - 1066	AW293538, AI092559, AI832511, AA627207, AW291756, AW183976, AI962670, AA700099, AW168783, AA187937, AI744061, AI280582, AA357855, AA357915, and AA287524.
HTKAA03	516	961002	1 - 472	15 - 486	AC073152, and AC073152.
HMSGF27	517	962420	1 - 319	15 - 333	AW239293, R67182, AI525934, R57498, AL356652, AL356652, and AL356652.
HHFLM17	518	963511	1 - 478	15 - 492	AA961650, AF156857, and X58523.
HLICL10	519	964035	1 - 953	15 - 967	AA813108, AW104688, AI568627, AW103392, AW162649, AI590972, AI310509, AA738015, AI571534, AA057588, AW162439, AI885573, AW161079, AW340971, W72707, AA115504, AI921337, AW129958, AA557274, AI633173, AI871012, W31113, AI796793, AI567126, AA523274, AI128901, AI446764, AI453358, AW406342, AA983656, N32288, AI266348, AI141099, AI692628, W72171, AI150513, AI719003, AA568990, AI207910, AW337739, N90858, AI625059, AA718959, AA680152, AI244976, AI274374, AW328277, N28784, N91985, AI144347, AI026846, AA985498, AI086684, AI340109, AA308736, C16991, AW005256, W76457, AI540270, AI362184, N57634, AA758329, AA315706, AA847568, C17735, N34490, AW405006, AA412277, AA305568, AI752072, N44671, AA968490, W94315, AW193908, N63840, AA983220, W77946, N99982, W78876, T67797, AA207109, N59578, W95620, AA232257, AW403143, AW405852, R80271, N63221, AA216675, AW406135, AI244746, R73829, AI185576, W95621, AI365487, AI034307, H04584, R80177, W02337, AI798821, W79814, H55929, AA019176, F29076, R73828, N77492, AI472659, N35299, AA299488, H42087, AA657858, AI597814, F36683, W20250, R98077, AA362606, AA897745, D19606, W17081, AA092576, AA227196, AA455149, AA225022, AA347889, AA199579, AA323284, N79224, AA376005, R09082, H84841, AA334514, AA338030, T86829, AA923644, W88824, AA335118, AA341202, AW388373, W01497, AA228342, T73475, AW007149, R53703, AA464332, AA349219, R09081, T65495, AA372939, AI364239, R09043, AA319678, AA604619, AA861467, AA385378, R23569, H89636, N77686,

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HCUAZ04	520	965585	1 - 533	15 - 547	AA775453, AI188379, AW071755, AI936998, AW328162, AI193568, AI884989, AI936930, AA663982, AI942475, AI051524, AI768357, AA854333, AI370872, AA782728, AI042548, AI376901, AI497960, AA449945, AA847549, AA664042, AI244325, AI497929, AA621746, AI362906, AI287500, AI192299, AA181903, AI150936, AI287835, H10076, AI263335, N36925, AI219081, AA040876, AA834370, AI698887, AA970020, AI350093, AI298971, Z38369, C01768, AA723370, T91018, T99077, AA811294, AW075555, AI458456, AW150403, H72858, AI458455, AI351313, AI214680, N77563, AI016859, C04735, AA448965, AA449692, AW135780, N36028, AA503553, AA766732, N93835, AA907195, AA588280, C04420, AA828413, AI539572, and AF151863.
HE2SB11	521	965611	1 - 597	15 - 611	AA598993, R67135, T27094, AI005415, R20829, AW270908, T27103, R54591, AW026781, D87455, AL139082, AL139082, and AL139082.

HCFLJ17	522	954723	1 - 435	15 - 449	AW363242, AA377300, AA047345, AA404974, AF155096, and AF135439.
HLICJ19	523	966969	1 - 888	15 - 902	AA490741, AA574026, AI632462, AI470259, AC008122, AL139317, and AL139317.
HDPSM18	524	967483	1 - 527	15 - 541	D61636.
HMAKJ82	525	967593	1 - 575	15 - 589	T08504, and R57907.
HFPEX37	526	971428	1 - 740	15 - 754	AA485538, N43924, N43932, AA280231, H74053, AA379028, AA215546, AA613434, and AL022328.
HHEKP47	527	974402	1 - 575	15 - 589	AL036268, AB026436, AC023609, AC023609, AC074220, and AC074220.
HTPDV62	528	418671	1 - 604	15 - 618	AI183902, AA683089, AA428773, AA617873, AA371747, AA302461, AA490902, AA299236, AA769215, AW001581, AI371135, AI369827, AI190177, AI141079, AI245438, AA541648, AI095638, AW007486, AA888067, AA534074, AI798016, AA632013, AI554292, AI422715, AW170631, AI818273, AI003005, AI356047, AI215137, AA126607, AW182892, AW006997, R54752, W58692, AI971642, AA652728, AA700953, AA594060, AI332799, AI991239, AA643082, AA287161, AA464316, AI690764, AI184848, AA534625, W73756, AA482551, AW275871, AA482406, AI312662, AW083880, AA767390, AI091265, AA128033, AI499037, AA029784, AA737008, AI291962, AA524858, AW173571, AI590872, AA069805, AA305086, AW269677, AI291963, AW296379, AI497938, AI092881, AA102025, AA642110, AA765044, H56621, AI671631, AI200177, AI348340, AA491087, AA887225, AI573191, AI038522, AA470747, AA806051, AI302373, AA609354, AA485738, AA284500, AI358650, H19929, AA829537, C00792, AA286924, AA937034, AA723098, AA594909, AI141128, N66142, AI833016, AW328470, AA128009, AA523296, AA808375, AI199216, AA761304, AA425912, AI028399, W61335, AA953934, AI568372, AI202858, AA641528, AI863193, AI347365, AW170380, N31038, AA974521, AA706349, W58693, W76033, AA306100, AA838347, AI750639, N20116, T08092, AI750622, AA151694, T52641, AI272226, AA746219, AI199802, AA399424, AA369769, U66895, L76200, and A11042.
HUSAJ73	529	567234	1 - 575	15 - 589	AA460750, AA425819, AA029238, AA186764, AA502584, AA337503, N45411, R96683, W61047, AF059617, U85755, M96163, and AF136583.

HSKCJ76	530	747380	1 - 510	15 - 524	AI905432, W61047, AA469989, AI905450, AI816821, AI905502, AW176008, AA147405, AA443501, AW301071, H19938, AA309139, AA425819, AA040824, AW369505, AW003283, AW393141, AW003882, AA460750, W60895, AI653404, AA029238, AA186764, AF059617, U85755, M96163, and AF136583.
HCEOX38	531	881200	1 - 373	15 - 387	AA325902, AA780425, AI372793, AA295021, R10658, AW239077, AA788891, AA325971, AI905357, AB035698, AB035697, AC005973, AC005973, and AC005973.
HFICR59	532	911317	1 - 1029	15 - 1043	AI190165, AI979249, AI917302, AI633819, AI624750, AI471728, AW196791, AI985423, AI471611, AA609421, AA705338, N22327, AI922484, N75202, AA811162, H79904, H79810, AW407702, AF162130, AC005084, and AF161181.
HPDVO67	533	911405	1 - 771	15 - 785	AA292182, R48226, R54747, AA954094, AI758877, AI963225, AI267732, AC005954, AF023617, AC005954, and AC005954.
H2LAD53	534	952181	1 - 348	15 - 362	AA313893, AA332909, R32396, and N57638.
HETLM90	535	954181	1 - 1950	15 - 1964	AI809477, AW183932, AW104451, N47929, AA133450, AL038022, AI803730, AL038036, N50618, T79916, D61735, AA844713, AA312942, AW369731, R73103, AA453226, D60618, R24675, AA501468, AA043536, AA092453, AL044155, AW006909, N42908, H02727, AI741612, AL044050, AA115744, AI638590, N29583, AL038023, N50560, AI281746, AF000145, and AC007684.
HCE5E94	536	969287	1 - 396	15 - 410	AI952978, AI432483, AI933748, AI469036, AI201084, AA927480, AA921974, AI653945, AA514329, AW451209, AW025649, AI282809, AI471152, AI873429, AI394698, AI129761, AI082334, AI393259, AI949581, AI247335, AI761818, AW296673, AI088000, AW242494, AI985953, AW082634, W69471, D58283, AI824226, D80043, D80522, AI206115, AI201684, AI219877, D59467, AI276710, AI144234, D81026, C14389, C15076, AW275101, AW188285, D80022, C14331, D80391, D80164, D59787, D80188, D80253, D80196, D59859, D80166, D80195, D57483, D51423, D59619, D80210, D51799, D59275, D80240, D80227, D59502, D81030, D50979, D80024, D80212, D80219, D80366, D59927, D80269, D59610, D80038, AW177440, AA305409, D51022, D59889,

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HFXCU55	537	499457	1 - 170	15 - 184	AR049599, AC034243, AC020758, and AC020758.
HEPBV24	538	513261	1 - 404	15 - 418	AR049600, and AR049599.
HFRAU96	539	527840	1 - 539	15 - 553	T56179.
HTLBD23	540	527944	1 - 483	15 - 497	

HCEBM51	541	536558	1 - 862	15 - 876	AI971509, AA977426, AA076336, AA742441, AA775500, W76467, R88591, AI952835, AA074145, AW196957, W72230, AA015637, AA322025, T16831, AI905037, F21343, AA322439, AW175812, AA300535, AA300534, AA102387, AW452926, AA961359, AW391317, U82381, AF120278, U79754, AF010310, AC008103, AC007326, AC007325, AC007663, AC007325, AC007325, AC007325, AC007326, AC007326, AC008103, AC008103, and AC008103.
HSLFF79	542	609838	1 - 898	15 - 912	
HKTAB71	543	661483	1 - 736	15 - 750	AA777511, AA203750, AI469206, AA894636, AI272051, AA676742, AA894649, AF111858, and AL023806.
HSDIF25	544	678003	1 - 534	15 - 548	
HNHHW82	545	684342	1 - 270	15 - 284	AC074221, AC074221, AC020884, and AC020818.
HFATN41	546	712097	1 - 725	15 - 739	AI541369.
HHFFG80	547	733387	1 - 540	15 - 554	AW058559, AI741080, AA581168, AI190754, AA581130, AL357556, AL357556, AL135799, AC025395, and AL135928.
HSDFF73	548	761657	1 - 751	15 - 765	I08480, I08481, I08487, and I08488.
HTLBH79	549	774422	1 - 560	15 - 574	AI927735, AW081044, AA662961, Y15061, AB026730, AB022537, and AL031228.
HBWCD80	550	777346	1 - 1008	15 - 1022	R61649, AA318906, T75101, F12865, F05122, Z42705, and AB011156.
HSDKI89	551	786812	1 - 509	15 - 523	AC012620.
HIBDA29	552	810879	1 - 504	15 - 518	AW294757, AI571188, AI879238, N51749, AA351100, AA350414, AI498064, AA058664, and AB029432.
HLDQU68	553	825558	1 - 452	15 - 466	AI927829, AI823488, AI767760, AI263072, AA203731, R02681, AI640611, AI796255, AI470622, U80018, U95090, U80019, U95090, U95090, and U95090.
HMUAS41	554	827510	1 - 373	15 - 387	AA386164, AA059359, AA586923, and D42047.
HTXOH20	555	837509	1 - 636	15 - 650	AA429144, W27414, T65501, R13762, F11826, AA652400, AI805064, AI379298, AC013591, and AC013591.
HSLFG13	556	847314	1 - 693	15 - 707	AC008792.
HDAAS21	557	850577	1 - 1049	15 - 1063	AI797146, AI332896, AI092892, AI138501, AI206010, AI085623, AI351499, AI192755, AI436068, AI435805, AI863222, AA992679, AA743758, AA581568, AA192138, AA972283, AA251083, AA319062, AA319128, and AA251720.
HARMH10	558	852701	1 - 847	15 - 861	N99474, U91561, and Z56563.
HSDAI07	559	859237	1 - 643	15 - 657	AC034099.
HLDQU41	560	864996	1 - 492	15 - 506	T68087, F06711, R11806, AF163312, AB013885, AP000355, M97662, AF169551, AP000356, AF169550,

					AF169553, AF169552, and AF169554.
HJBU06	561	864997	1 - 1728	15 - 1742	AI770035, AW271417, W55897, AA931190, W55898, AI636003, AI640625, AW058589, AI241138, H11714, AI289211, AW241904, AW206632, H07104, AW271340, AW024333, AI470949, H18514, F06711, R11806, AI470928, AI763034, W86945, AW242530, AW275470, F02979, Z20962, H19181, R37721, H55419, T67940, H11783, H55374, AB013885, AP000355, AP000356, AF163312, M97662, AF169559, AF169555, AF169554, AF169558, AF169553, and AF169556.
HSLDO63	562	866332	1 - 509	15 - 523	AC074219, and AC074219.
HNHAG26	563	866694	1 - 1430	15 - 1444	AI526107, AI535772, A38246, E00893, A11530, AR029499, AR029496, A11542, AC074220, and AC073351.
HBGBC61	564	867065	1 - 437	15 - 451	
HMAEM27	565	870252	1 - 810	15 - 824	AI123252, N48389, AA253248, AI553735, AI677937, AI624207, AI858995, AA172135, AW090335, AW001173, AA936673, W22712, AA418262, T51498, AI738891, AA776947, AA429081, AA479552, AI282752, AI679217, AW135936, AI391727, AA310952, AI370861, AA010403, AA349379, AA477652, AA825912, AA633113, AA824470, AI086260, AA102039, W21146, AI826473, AW166857, AW328108, AI921151, AA485927, AW248844, AA553582, AI417403, AW196852, AA827239, AI000593, AA252975, AI688558, W78065, AI278222, AI351936, AA747665, AW069300, AA835073, AI816982, AI677698, AI273412, AI494393, AI690880, AW300939, AI744393, AW151639, AI701741, AA281891, AI022203, AW055328, AW189489, AI335033, AW191910, AA614800, AI963519, AI291643, H93308, AW102892, AA922355, AI798622, AA649492, AA640412, AI348316, AI908220, AW169588, AA559323, AA494168, AA629519, AI420052, AI871728, AA248734, AA632551, AA678714, AI436729, AA724241, AA410619, AI139715, F22136, AI392945, AI681696, AA360250, AA383763, AI418290, AI564737, AA094866, AA034216, AA897218, N93463, R32024, AI584164, N79246, AI202936, AA232241, AI475305, AW023868, R21445, AI017328, AA533400, AW245332, AW008988, AA766527, AA092266, AI291648, R32077, AI219344, AI352417, AI985631, AI202282, AW204768, AA759019,

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HEBCK42	566	875541	1 - 602	15 - 616	AW389864, AW389904, R91225, AW389872, AW389865, H43267, AA001752, AI124886, R93360, AA279355, AA075438, AW390360, AW390420, AI904749, AW391359, AW361085, R52400, AA374032, R07746, AI078153, AI744359, AW103948, H50264, AW009649, AW361035, AA730829, AA694204, AI984487, AA314588, AI880499, AI672843, AW390362, AF108211, AB026723, AF154065, AR061907, AF119665, AL355138, AL355138, AC067749, AC067749, and AC067966.
HELFN03	567	881180	1 - 728	15 - 742	
HKIMF95	568	882308	1 - 256	15 - 270	AI825821.
HTLHE85	569	883263	1 - 770	15 - 784	AI369696, and AB029432.
HTEOE72	570	886412	1 - 662	15 - 676	D51799, C14389, AA305409, C14331, D58283, D80022, D80024, D80043, D59275, D59859, D59467, D80166, D80195, D80227, D51423, D59619, D81030, D80210, D80391, D80164, D80240, D80253, D59787, D59502, D80212, C15076, D80196, D80188, D80219, D59927, D80269, D57483, D80366, D80038, C14429, D50995, D50979, D59889, D80193, D59610, D80378, D80241, D80045, D51060, D51022, AW179328, C75259, T03269, AW178893, AA305578, AW177440, C14014, AW378532, AA514188, D81026, AW178775, D80134, D80248, AW178762, D80251, D80522, AW369651, D51250, F13647, D58253, AW177501, AW177511, AA514186, D80133, AW360811, AW352158, AI910186, D80168, C05695, AW352117, AW176467, AW375405, C14227, C14407, D80132, AW377671, D80268, D81111, AI905856, C14298, D80064, AW366296, AW360844, AW360817, AW375406, AW378534, AW179332, AW352170, AW377672, AW179023, AW178905, AW378540, D80247, AW178980, D80302, Z21582,

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HELBN13	571	907599	1 - 772	15 - 786	
HFIJE03	572	914882	1 - 1749	15 - 1763	AW195390, AA603321, AA626629, AI972913, AI923429, AW297299, AI587102, AI206973, AI623146, AA827831, AI653482, AA579779, AW264892, AI418052, AI637485,

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HABGE01	573	915743	1 - 1376	15 - 1390	AF039235, AI669256, AW245958, AI763048, AW237088, AI093187, AW296090, AI571378, AI354976, AI680102, AW119180, AI140327, AI201269, AA934553, AI991982, AI203368, AA625161, AW268813, AW152391, AA497000, AI243335, AI185996, D80898, AI887841, AI312767, AA559846, AA040597, AA315994, AI902903, AA373939, AA634307, AI700879, AI671153, AA358918, AI824923, AA918570, U25751, AI916936, AI927665, AI738973, AA362530, AI867799, AW087508, AI810550, AW196382, AA359868, D80899, AA954586, AA738423, AI698559, C01220, AI432152, AA489585, F31194, AA361102, D20015, AA928147, AA040679, T19862, and T27189.
HWLKM02	574	917409	1 - 1540	15 - 1554	AI761206, AI953838, AI693635, AW006136, AI660354, AI675370, AA531031, AI630826, AW136334, AI798001, AA489499, AI740676, AI347578, AI678160, W46904, AI624880, AA648930, AI612996, AW002247, T65409, AW246759, AA845556, AI970510, AI863578, W17109, F09619, T65484, AW392670, AL119522, AW372827, AL119391, AL119324, AL119497, AL119319, AW384394, AL119396, AL119484, Z99396, AL119457, AL119443, AW363220, AL119335, AL119483, U46351, AL119363, AL119496, AL119401, AL119355, AL119341, AL119399, U46350, AL119418, AL119439, U46349, U46341, U46347, AL119444, AL134524, AL037205, AL134536, U46346, AL134527, AI142137, AL134525, U46345, AL134518, AL134528, AL134538, Z98258, AR060234, AR066494, A81671, AR069079, AB026436, and AR054110.
HOVEB13	575	917564	1 - 1360	15 - 1374	AA928779, AI685200, AA576884, AI218215, AI809292, AI355487, AW082223, AW263592, AA424504, AW152614, AI265774, AW070728, AA933972, AA927905, AA707564, AI921682, AI431416, N30148, AA132983,

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HE8UB94	576	920288	1 - 547	15 - 561	AL039567, AA088498, AA424424, T06192, AA337881, AW389515, AW450646, and AB028973.
HTHDJ23	577	921274	1 - 1727	15 - 1741	AA251720, AA319062, AI057495, AA319128, AA829101, AC068620, and AC068620.
HWHPB72	578	922580	1 - 766	15 - 780	AL036002, F03069, AA449870, F04459, F04460, T83997, AA083638, W56855, T83996, AI207629, AI133385, AA773032, AF143874, and AF118086.
HSQFX64	579	922581	1 - 407	15 - 421	AI807806, AA773032, AA666091, AI478904, AL049697, AL049697, AL049697, and AL049697.
HDABB84	580	922582	1 - 1810	15 - 1824	AI807806, AI016336, AI761537, AI129813, AA773032, AA081053, AI741788, AI243753, T15983, AA024496, AL036002, AA872294, T70068, AA485935, W60361, AI399722, AA489546, AW187991, AW004932, AI272983, AA677350, AA532887, AA083638, AA317035, AA954840, AA954525, T70137, AI419877, AI872382, AI684078, AA666091, AW236842, AI739236, AW102712, F09944, H08382, W56855, F03069, W77737, T79040, AI635896, F04459, W84730, F04460, AA938144, AA203730, T83997, AA860638, AA505476, W78907, W72075, T83953, AA533240, AI478904, AI207629, AI133385, C01935, R12777, AA449870, T85407, AL049697, AF143874, and AF118086.
HLHFN83	581	924110	1 - 662	15 - 676	AI765848, AI435448, AI458176, AI268603, AA677741, AI470359, and AI382545.
HPCRR26	582	926401	1 - 857	15 - 871	AA826261, AI631834, AI652054, AI659468, AW299808, AI609264, AI767730, AW149124, AI744114, AW083268, AA584429, AA485965, AI636509, AA872632, AI424281, AI380961, AI890797, AI768770, AA552396, AI478192, AA612591, AI469010, AI309965, AI380658, AA883173, AI392779, AA876047, AI095446, AI800022, AI016332,

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HCMUSD61	583	927475	1 - 1583	15 - 1597	AA436098, AA863239, AA682545, AA568261, AW383298, AI078271, H54890, W65386, AA435999, AW383307, AW383294, AI302210, AI078613, H97506, N64810, AI148069, AW383306, R91322, AA328807, AA205935, AA830860, AI311836, AI351180, C18047, AA299314, AI866392, AA367137, H13750, AA938701, AA295495, AI525903, AI241160, AA344078, R91283, AI525902, AA873329, D82264, H13698, W61290, AA054016, AA013384, AA018279, N75659, W96254, AA018267, AW379331, AA827396, H86191, AA056119, and AF151841.
HCEEC58	584	933866	1 - 314	15 - 328	D42047.
HSYAD06	585	935334	1 - 751	15 - 765	AL041803, AI691071, AA533580, AI346697, AI860607, AI334249, H80063, AA479938, AW298530, AA974288, AA478842, N34165, AI652460, AA779617, AI202133, AI498814, AI831564, AW135145, AI638858, AI979246, AA455332, N39978, T52099, AW408005, AI991562, N88572, AI887050, AA992515, AW072133, T47349, AA291693, AL035086, and AL117452.
HUSID53	586	943374	1 - 1050	15 - 1064	R95789, and AA323316.

HRGDE77	587	948737	1 - 1876	15 - 1890	R20962, Z45236, F08632, AW407497, AA343968, AA226870, AA503842, R01824, R06788, AB033010, and AL137675.
HEGAU68	588	950009	1 - 558	15 - 572	AA057228, H85626, H39014, H37972, AI907720, AA013159, AC060820, AC060820, AC068946, AC068946, and AC068946.
HNGKH38	589	951032	1 - 237	15 - 251	AI963473, AC019122, AC019122, and AC019122.
HNHNN26	590	952398	1 - 392	15 - 406	AC078913, AC074334, AC074334, and AC010357.
HTEHP64	591	953791	1 - 488	15 - 502	AI962178, AW301662, AA906865, AI655904, AA206437, AI929167, AI929609, AI879995, and AI815694.
HMIAO78	592	953793	1 - 666	15 - 680	AI962178, AW301662, AA906865, AI929167, AI929609, AI655904, AI815694, AA351116, and AA206437.
HFPCN94	593	955009	1 - 1460	15 - 1474	AI830691, AI948511, AI357436, AI972408, AI697857, AI826256, AI422683, AW341450, R56168, AI651095, AI761400, AI768573, AI831948, AW300444, AA393313, AI288333, AI417903, AW165982, AW271819, AW085599, AI927043, AI936396, AI421517, AA988563, AI523543, AI817020, AI420397, AW149563, AI889625, AA594835, AI694269, AI634398, AI283759, AA653712, AI392973, AI304849, AI675030, AI831197, AW237591, AA872799, AI452397, AI368689, AI190058, N29545, AA837984, AW172298, AI253197, AI375540, AI830712, AI862664, AI992087, AI827278, AA057861, AI300150, R33735, AI082343, AI926819, AI619923, T04917, T35202, AA759006, AA356968, AI632766, N52709, AA502373, AA043670, AI831516, AA937125, AI262912, AA642808, T96330, AI823952, N47832, AW196914, AI630735, AW028564, AA057051, AI684627, AI806818, AI654087, AA371419, AA974906, AW294325, AW193208, AA423938, AI919454, N32607, AI369782, AA256421, AI769153, T93496, AI300625, AW025718, AI991799, W15206, AW378641, AA043828, AW403029, D11567, D11569, D11572, D11571, D11561, D51030, AL035461, and D11568.
HSLHV08	594	958582	1 - 153	15 - 167	E07939, E02606, AC074220, AC074220, AC074221, AC022123, and AC055703.
HPDVW40	595	961039	1 - 951	15 - 965	AI948584, AI678666, AI765219, AA813511, AA702993, AA620965, AI990303, AA194467, W19706, AI004689, AI003925, AI004690, AA194383, AI338870, AI082639, AI127228, AI934786, AI770075, AA812597,

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HEMFC70	596	961963	1 - 1564	15 - 1578	AI674223, AW372210, AA600053, AW068223, AA553729, AA329976, AA215696, AA164298, AA164299, AA280511, AF151828, AF147717, AF148446, AF175903, AF148447, Z57619, and AF065398.
HLDOO20	597	910371	1 - 145	15 - 159	AI432644, AI623302, AI432653, AW081103, AL045327, AI431307, AI431316, AI432654, AW128900, AI431238, AI432650, AL134524, AI432666, AI431230, AI432677, AI431323, AI431328, AI431321, AI431315, AI431353, AI431312, AL135012, AI432655, AI431310, AI431354, U46344, AL042729, AL042898, AI492519, AI431347, AL042655, AI431243, AI431246, AL042853, AI431357, AI432675, AI432661, AI431337, AL047611, AL042533, AI431235, AI791349, AL042787, AL043166, AL042515, AI432647, AL042931, AI432649, AI431351, AI432645, AI432651, AI887775, AL043091, AI431255, AW089557, AI432674, AL040207, AI431330, AL042488, AI866786, AL043089, AI432656, AL046356, AL043321, AI431248, AI431241, AI804505, AI432665, AL047675, AI440260, AL043295, AI926593, AI432672, AI567961, AI539771, AI537677, AI494201, AL042508, AI500659, AI539260, AI866465, AI815232, AI801325, AI500523, AI538850, AI582932, AI284517, AI923989, AI872423, AI590043, AI500706, AI445237, AI491776, AI289791, AW151138, AI521560, AI889189, AI500662, AI582912, AI284509, AI539800, AW172723, AI889168, AI440263, AI538885, AI927233, AI866573, AI633493, AI434256, AI866469, AI805769, AI434242, AI888661, AI500714, AI284513, AI888118, AI285439, AI436429, AI859991, AI798359, AI889147, AI623736, AI355779, AI371228, AI581033, AI491710, AI440252, AI440238, AI431257, AI567971,

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HSLEP67	598	963505	1 - 440	15 - 454	
HSLEP94	599	964463	1 - 1341	15 - 1355	D57186, and C16289.
HSENS89	600	964527	1 - 1039	15 - 1053	W52878, R10513, R17310, AL117452, and AL049694.
HNTAF77	601	966190	1 - 505	15 - 519	AI436205, AI280203, AA479713, AI421639, AA479835, AA400807, AI278910, AW452244, AI080729, AI220942, AA283689, AA678969, AI290458, AA757964, AA687788, AA972381, AA290711, AA149275, AA149261, AW050584, AA906243, AA812702, AA909387, AI525571, and AI557278.
HBIOV48	602	967566	1 - 523	15 - 537	T87573, and AL049709.
HBGMN45	603	967744	1 - 696	15 - 710	AC022123.
HBXCE20	604	970889	1 - 880	15 - 894	
HSLJU88	605	780811	1 - 527	15 - 541	
HKGDQ60	606	863330	1 - 756	15 - 770	AI929390, F00197, Z24927, AA019708, AC002400, and Z59200.
HSDKF67	607	933059	1 - 456	15 - 470	AC020885.
HSLFT94	608	603023	1 - 416	15 - 430	
HTJMD06	609	837603	1 - 482	15 - 496	AB002346, AF039945, AF041860, AF041858, AF041857, AF041859, AF041862, AF026123, and U90312.
HNTBH68	610	851274	1 - 569	15 - 583	AW157233, Z43649, C15376, and R20382.
HMEKO39	611	863507	1 - 669	15 - 683	
HAABH11	612	965473	1 - 685	15 - 699	AA418447, H83353, H85525, and AA759336.
HUVFZ43	613	910860	1 - 1436	15 - 1450	AL121363, AI569727, AL121364, AA296414, Z17339, and AA345259.
HCEPH84	614	910864	1 - 1677	15 - 1691	AA663485, AA442393, AA167722, AI651722, AA056327, AI479964, AA191589, AI194037, W76203, W72966, AA193004, AA436615, AA019920, AI298004, AA206829, AI372800, AA207119, F33105, Z25123, T33292, AI372801, AI221332, AA054088, F36674, R51792, AA019932, R49566, F23450, R56064, AI937722, F28731, F26963, AI609568, F36659, T77421, AA350199, T51483, F25641, AA058465, R38363, AW248425, F25571, F08410, R55818, AA191072, T47787, R56176, AA054025,

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HNFD052	615	916260	1 - 345	15 - 359	AA357035, U23853, L11329, and AC012307.
HHEJR23	616	919082	1 - 850	15 - 864	AI440338, AA868192, AI808409, AI567414, AI278014, AI291975, AW304837, AW024447, AI341786, AI183586, AW024630, AI302861, AI208559, AA043196, AI492200, AW103254, AI214841, AI160734, AI868969, AA741444, AA731505, AI469608, AI351129, AA947737, AA970703, AA043598, AA045490, AI095776, D25707, T19154, AI187765, AA058909, AW087623, AA652268, AA507020, AA291791, AW449034, AA434511, AI809374, and Z46372.
HMTAX31	617	971343	1 - 1173	15 - 1187	AW188661, AA406582, AA847680, AW167272, AW151243, N25994, AA621715, AI015551, AI829183, AI290229, AA410486, AA815315, AI040507, AI818989, AI040765, AI636434, AW167634, AI085194, AI342313, AA406387, AA827049, AA812382, AA769207, AI278749, R60575, AA983613, N36626, AI283824, AI128463, AA374753, AA911296, AA484968, AA463739, T30540, T53444, AI126964, AA411633, R70442, AA256096, AI655254, AA410304, R37051, AA872115, AA528102, AW385663, AA625487, AA985260, AA411672, AA411671, AA988584, AA284022, H42417, D20266, AI916438, AA345748, R69455, H42445, AI753452, AL079839, H82446, and AA285169.
HKIYI74	618	729217	1 - 335	15 - 349	R88881, and AI863797.
HSKEI21	619	760792	1 - 471	15 - 485	AA143590, AA311671, AW245740, AA085284, AA380905, AA314649, AA053488, AA115821, N40293, R48031, and AF005050.
HKAFK68	620	869127	1 - 593	15 - 607	AA085284, AA311671, AW245740, AA053488, AA143590, AA115821, AA380905, N40293, R48031, AA314649, N41781, AF005050, AF005051, and V00143.
HSRBB92	621	905110	1 - 2332	15 - 2346	AI992179, AW188159, AI926499, AI926498, AI763400, AI421095, AA862284, AI720384, AI869696, H38016, AA831687, AA307183, AI018137, AA486789, AA974505, AI090091,

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HWLLR80	622	931564	1 - 701	15 - 715	AI394051, AI459549, AA143102, AI801370, AA640186, AW117949, AI458156, AA687760, AA292780, AW001899, AI434131, AI033982, AI693547, AA631567, AA652457, AA477424, AA918511, AA573416, AI826270, AA778640, AA290862, AA150391, F22701, AA890730, AA479585, T09094, AA291044, AA394172, AL139349, and AL139349.
HWLWQ87	623	932577	1 - 2039	15 - 2053	AI184616, AL038128, AI052689, AI825541, AI469846, AA065183, H97839, AA065182, AA482001, AA463816, AI129295, AA776688, AW003401, N29911, AI355425, AA401877, AA262093, AI654596, AI338040, AA419345, AA401808, AA223738, AA746383, AA565389, AI559679, AI290048, AA862959, H44548, AW085914, H73079, AA460252, AA205374, AI344645, AA148676, AA094905, AA148677,

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H6EEP53	624	942872	1 - 2427	15 - 2441	AA203660, AW005296, AI832389, AI884876, AI821774, AI857542, AI375889, AI126807, AW105425, AI683390, AW327749, AA583197, AW083560, AW374291, AI498223, AW300679, AA604543, AI940644, AA130045, AI301571, AI148078, AI569649, AI937172, AI081042, AA002152, AA078817, AI159912, AI445561, AI805657, AI052455, AI079310, AI812099, AA609319, AA757372, AI276854, AA448176, AA310487, AA134039, AA781740, AI684850, AW087416, AI792120, AI694019, AI127345, AA340907, AA813907, AI052449, AA960856, AA037280, T50735, H78343, AA634578, AI025798, AA379889, AA325546, AA625807, AI500194, H66564, F17150, AA078916, R71136, AA405506, AA577413, R97651, AA354162, AI814129, R21055, AW004806, AI940640, AI352262, AI240763, AI280471, AA889088, H78344, T23478, AA878694, AA365252, H26970, AA336606, H14637, F03913, AA933720, R46235, AA333121, AI869601, F36821, AW074558, M78972, M78956, AI475077, AI126126, F29918, AA427399, AA428254, T50891, AA715028, R11273, T91917, T98945, T98995, R11215, R85210, T27952, F29924, AA910724, AA865297, AA554928, F07663, AA653527, AA132925, AA844613, AI147818, H14931, AI214070, N51632, AA564700, D50913, and M57728.
HE2KZ56	625	968439	1 - 378	15 - 392	
HFXHD52	626	490721	1 - 612	15 - 626	L48842, and X55499.
HPMAM67	627	915879	1 - 63	15 - 77	AA369592.
HBXFI75	628	566766	1 - 1283	15 - 1297	D79572, AA127422, AA127356, D62400, D79542, AI526056, D79553, and AA599103.
HELGM94	629	913938	1 - 1667	15 - 1681	AI278617, AI609398, AI290739, AI081552, AA621655, AA868455, AI608719, AI567964, AA421224, AA421214, AW193527, AI754809, AW009516, AA868840, AW001133, AI022091, AI376946, AI735188, AW247558, AI689150, AA993670, AI743002, AW009876, AA911941, AA888156, AI277633, AA602889, AA830904, AA579086, N40529,

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					AL133568, AF180525, AL050155, AF085809, L04504, AL137665, X72889, D83032, I89944, AL137300, A57389, AF090943, X87582, U92068, X62580, AL049430, E12580, X52128, AF153205, AF112208, AL133016, AJ012582, AF182215, AL110159, U54559, AB026995, E05822, Y11254, AL110196, AL133080, AF087943, Y10936, AL133081, AL110197, A93350, AF090886, AL117457, U66274, AL136842, U62966, AF177401, U49434, AL137656, Y08616, I32738, AF030513, AF139986, and AL096751.
HLJDQ52	630	923110	1 - 935	15 - 949	AA315016, AL120879, AL120792, Z19401, AL120263, and D29641.
HAJAW40	631	1219455	1 - 2564	15 - 2578	AI859306, AI623176, AW148834, AW328636, AW452043, AI401651, AI590936, AW440292, AI927932, AW129458, AI688898, AW028230, AI679554, AA189073, AA022896, AI914123, AI953392, AW379303, AI478661, AI393850, AW135223, AA948188, AI707720, AA046652, AA723570, AA047432, AA988434, AI476239, AI095386, AA635582, AA248375, AI970014, AA436606, N99593, AA191176, AI990341, AI474757, AW370851, AI282056, AI750123, AI567697, AI679994, AA046782, W22335, N71694, H70453, AA047471, AI540598, AA427600, T24033, AA627163, AI074380, AW192917, T93690, AA022895, AW028993, AW379298, AL137423, AL121653, AL121658, AF159131, AW629642, and AW770733.
HATAZ67	632	1106635	1 - 754	15 - 768	AA319531, W27441, AI954747, AI953699, AA319415, AF155140, AF142629, and AF142630.
HBUAC02	633	1220017	1 - 973	15 - 987	AI719346, AA310771, AA233019, AA485496, AA411844, AA653679, AI129243, AI589063, AA829388, AA830191, AW300947, AI804787, AW206297, AA864496, AA485340, AA411764, AA831521, T47212, R10201, AA853167, AA810264, AA806768, T47213, AW206611, AA601948, R23156, AA483462, AI621256, AW382583, T91085, AW014353, AW069654, AW362889, AW051869, R10100, AL022318, AR037576, and U61084.
HCWEQ14	634	1117318	1 - 355	15 - 369	R16298, AA488261, R15246, AA325932, F08114, W46162, H08289, U69190, R12912, and AC002985.
HDPWH41	635	1228148	1 - 1065	15 - 1079	AA206575, AL040482, N31555, AA830558, AA489584, AI866480, AA595742, AI983534, T51330, AA403243, and AC007450.
HDQEH61	636	1213567	1 - 902	15 - 916	AA232431, AF171063, AL049557,

HDTDD72	637	587710	1 - 520	15 - 534	AF106019, and AL133598. AI459473, AI065079, AI207423, AI064695, AI133218, AI133420, AI133314, AI061660, AI064797, AI888487, AL037870, AL037849, AL048429, AI884494, AI833147, AI717995, AI709394, AI832355, AI924211, AI720552, AI653760, AW007608, AI064831, C18852, AA669077, AI174665, AA468404, AI750150, AA533828, AI133004, AA659265, AA594949, AL037048, AA630170, AI912529, AI434498, AI459425, AA575977, AW275829, AA886596, AI215649, AW270021, AI124928, AA578589, AA548849, AI832732, AA098789, AI628930, AW004905, AI720986, AA630251, AI683207, AW149630, AA886490, AA595864, AI028073, AI880409, AW188463, AA075342, AI635477, AW168232, AI720912, AI133259, AA226261, AI766356, AA493969, AI557254, AW166013, AA650306, AA481885, AA224000, AA643797, AA522984, AA630934, AA635953, AA640561, AA081407, AA487595, AI523371, AA928597, AA641058, AA196188, AI174946, AI720139, AA223926, AI207597, AI917042, AA485715, AA715869, AI114770, AI581199, AI282481, AA434248, AA888285, AI457496, AA661972, AA610388, AA655025, AA654984, AI566184, AA565126, AA579042, AA468098, AI619745, AI281861, AI880360, AA846579, AI566210, AW148749, AI673024, AA490180, AW439689, AI459556, AW151854, AW105642, AA565898, AA640469, AI114764, AI114776, AW276852, AA653781, AA487063, AA494046, AI440020, AI719804, AA557411, AA525479, AI133099, AA554077, AA151927, AI749073, AA180944, AA564042, AI719813, AW264074, AA831811, AW170761, AA689249, AA658941, AA578602, AI749006, AI819696, AI557330, AA458961, AI525681, AA664578, AA708303, AI708946, AA541550, AA569249, C17580, AA069723, AI832960, AA715954, AI832523, AA621867, AI459634, AA152380, AA978232, AW165955, AA429018, AA487982, AA171686, AA469406, AA640693, AI133698, AA483365, AI453511, AA987421, AI630887, AI289950, AA654821,
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HFRBN02	638	1152485	1 - 975	15 - 989	
HKAIH72	639	1107045	1 - 1532	15 - 1546	AA767021, AW166918, AI766199, AI452639, AI057325, AW189378, AA810530, AA483372, AI866604, AW044075, AW021928, AI868618, AW365612, AW365576, AW365562, AW365564, AW365557, AW365563, AW062583, AW365608, W00829, AW365604, AW365616, AW365578, AW365618, AL119457, AL119399, AL119324, AW365558, AW365580, AL042544, AL134524, AW372827, AL134920, AL119443, AW392670, AW365605, AL119464, U46341, AL119497, AL119319, AW363220, AW384394, U46346, AL119444, Z99396, AL134902, AL119484, AL119363, AL119391, AL119355, AL119335, U46347, U46350, U46351, U46349, AL119418, AL119483, AL119341, AL119522, AL134531, AL119439, AL119496, AL119396, AL037205, AL042614, AI142134, AL134528, U46345, AL134527, AL134529, AL134538, AL042433, AL039912, AL042450, AL043029, AL042965, AL042975, AL042542, AL042970, AL043019, AL042984, AL042551, AL043003, AL119488, AF052573, AF043628,

					AR060234, AR054110, AB026436, A81671, AR069079, and AR066494.
HMAAD90	640	1152487	1 - 321	15 - 335	AL036709, AA492039, AA480432, AI675759, AI310999, AI198128, AA470422, AI222500, AI222494, AI885387, AI417419, AI870576, AI362796, AA973526, F18212, F23380, AA255557, F26119, AA705897, AW188850, AA255573, F21180, AA887681, AI312521, AI814011, AA759050, AA970515, N98399, AI808283, AI300545, AA552854, AA548657, AI253561, AA552841, AI338845, AA405901, T95328, F25043, AI148243, AI473324, AA687476, AA813127, F30098, AA876096, H54563, T88808, AA225065, AA662762, F16777, AA875832, T84447, T07882, T95412, F18066, AW002081, AA652602, F31172, AI809118, AA652605, AI749046, AA594311, AA496173, AA482817, C01859, AI073587, AI625931, W30875, X65386, AA339117, C00492, AW378056, F23399, AA946903, AI719805, N88097, AA662678, AW150655, AF070653, AF044955, and X63217.
HMABQ71	641	1105540	1 - 550	15 - 564	
HPJEV95	642	1105131	1 - 513	15 - 527	AA159265.
HSKYR59	643	1219545	1 - 771	15 - 785	AI436567, AW025337, AW169182, AI569227, AI139724, AI141899, AI591301, AA854784, AW150213, AW247984, AI741314, AI300843, F36347, AI368644, AA595581, F36231, AA683311, AI474473, AI955025, AA587348, AI751754, F22837, AA989456, N30389, AW029404, F36593, AA305633, F20361, F36917, AW165991, F24206, AI042128, AI095107, F32977, R73935, AI129750, AA868044, AW405128, F17512, F18703, AA524164, AA468826, AI721079, AA320717, F22415, AA635920, AW024494, F17447, N92990, AA652198, AA877836, AA622113, R73861, F32883, W21200, AA365956, AA933941, AA112399, C04792, AA669314, AI890772, AA969137, AW170139, AW249737, AA133294, F31981, F33657, AA496585, F17060, R73865, AA570123, AA641698, AA947075, AA886447, D19843, N66357, AI858734, AA588495, AI242208, AI690305, AI491831, AI475178, AW246610, AW050899, AI866002, AA570038, AI561299, AI539028, AI627880, AI569328, AI524526, AI744256, AI828714, AL135661, AI919345, AI284131, C01182, AI310332, AW082594, AI383919, AI251830, AA883848, AI697324, AW102785,

					AW103371, AI828731, AW192226, AI364788, AW196105, AI636719, AA225339, AI680389, AI624668, AI348897, AI648663, AW103893, AI868831, AI698401, AI922216, AI366549, AI567351, AI554245, AW071417, AI590120, AI499652, AI250663, AI802833, AI400725, AI269696, AI572892, AW192375, AL134999, AI480118, AW082040, AI889147, AI609593, AW051226, AI651045, AI866887, AI608936, AI699011, AA658033, AI433976, AI612759, AI568765, AI539238, AI872074, AI343112, AI498579, AW301300, AI349598, AW006270, AW075207, AI611348, AI345735, AI225047, AW195968, AW193134, AI933785, AI251205, AI307210, AL041150, AI799195, AI520931, AI955906, AI313320, AI344928, AI343030, AW118398, AI921176, AW268122, AI766980, AW079572, AI312146, AW195957, AI312339, AI824444, AI345258, AI340582, AW268220, AI311604, AI924686, AI334450, AI446605, AL038565, AW090013, AW268302, AI306613, AW262565, AI538342, AW023590, AA493923, AL120736, AI476109, AI244136, AI627988, AI631057, AI567582, AI783504, AA857311, AL079963, AL119863, AI349645, AI874166, AI445165, AI963216, AI670009, AI160954, AW149227, AA857198, AI805638, AI866573, AL036214, AL045266, AI587288, AA494167, AI570384, AI890784, AL036945, AL120853, AW059837, N80094, AW074869, AI277546, AI269862, AI310575, AI344785, AI952761, AL041772, AI312428, AW302965, AW074993, AI620284, AA291456, AI358701, AI570781, AI955866, AW117919, AI340533, AI829327, AI471361, AL119791, AL045500, AI590423, AI282326, X63422, X63423, AC004221, I42402, I48978, AL133093, U42766, A93016, A08916, I89947, A08913, A08910, I89931, A08909, AF125949, I49625, AF061943, X96540, AF113013, AF078844, AL080060, I48979, AF113690, A12297, E15569, AJ012755, AF113694, AL049382, Z72491, AF125948, Y14314, AL122121, AF090943, AL049430, AF111851, AF113676, X72889, AL133640, U00763, AR011880, AL049466, X82434, AF097996, AR000496, U39656,
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					AB019565, AF118094, I09360, AL137459, AL133016, AL050108, AL050393, AF104032, AF119337, AL049452, AL117585, AF026816, AF090901, AL133072, AF091084, AF017437, AF113677, AL050024, Y11254, AJ238278, AL117460, AL122093, U91329, A58524, A58523, AL049314, S78214, X84990, AL133557, AL080137, AL122110, AL122049, Y16645, AF118064, AF118070, AL133080, AL122050, AF113699, X70685, AL117583, AL133077, AL133113, AL080124, AL122123, AF079765, E07361, AL133104, AF113019, AF113689, AF067728, AL049464, AF113691, AL122098, AF026124, AL080127, AF158248, S68736, X93495, E03348, AF090934, AL137557, A65341, Y11587, E04233, AL110196, Z82022, AJ242859, AF183393, AR059958, AL110221, E07108, X65873, AL133606, X63574, AL137648, AL050277, AL050149, L31396, AL050146, AL110225, AL117394, AL137527, L31397, AL110280, AL050138, AJ000937, AL137523, AL137463, AL117435, AF106862, AF090900, AL117457, AL096744, I03321, AL137550, AL137271, AL137538, A93350, AF017152, AL050116, I00734, AL133560, A08912, I26207, A77033, A77035, AL080159, AF087943, I33392, AL137560, U72620, E02349, AF090903, E00617, E00717, E00778, AF177401, AF146568, AF090896, U80742, U35846, AL133565, A03736, AL137521, AF111112, L19437, AL137526, U67958, AL133075, AL133014, E08263, E08264, M30514, AL050172, AF079763, S61953, X98834, AF003737, E08631, AL137556, AF153205, AL049938, AL110197, A07647, AL049283, Y09972, U96683, AF162270, AL049300, AL117440, AF185576, AL137476, AR038854, AL080074, X92070, AL133568, AL133067, U68387, AR038969, A90832, L30117, AF008439, AL133098, A45787, AF057300, AF057299, AL137283, X87582, AF111849, AF061573, X62580, U58996, AL137533, AJ006417, I41145, U49908, AF081197, AL137273, Y07905, I17767, X52128, Z37987, AL137480, AL122118, E05822, AR013797, U78525, AL110222, E06743, AF106827, AL117432, AL080154, AL080086, Y10080, AF081195, AL122111, AL023657, U49434, AF067790, AL050092, E02221, AL137292, AF051325, and AA113155.
HSWAM16	644	1151512	1 - 716	15 - 730	AI436567, AW025337, AW169182, AI569227, AI139724, AI141899, AA854784, AW150213, AW247984,

					AI591301, AI741314, AI300843, F36347, AI368644, AA595581, F36231, AA683311, AI474473, AA587348, AI751754, F22837, AA989456, N30389, AI955025, AW029404, AA305633, F36593, F20361, F36917, AW165991, F24206, AI095107, AI042128, F32977, R73935, AI129750, AA868044, AW405128, F17512, F18703, AA524164, AA468826, AA320717, AI721079, F22415, AA635920, AW024494, F17447, N92990, AA877836, AA652198, AA622113, F32883, R73861, AA365956, W21200, AA933941, AA112399, C04792, AA669314, AI890772, AA969137, AW170139, AW249737, AA133294, F31981, AA496585, F33657, F17060, AA570123, AA641698, R73865, AA947075, AA886447, D19843, N66357, AI858734, AA588495, AI242208, AI690305, AI491831, AI475178, AW246610, AW050899, AA570038, C01182, AA883848, AA857198, AI277546, R73947, F32287, AA887758, AA113155, H67249, X63422, X63423, and AC004221.
HSXCW82	645	1164013	1 - 1662	15 - 1676	AI583244, AI979252, AI814895, AI922918, AI745032, AI928093, AW418587, AW168141, AW247304, AI858297, AW247122, AW262999, AI677816, AW246178, AA614113, AI126200, AW001311, AA533914, AI540189, AI763049, AI400893, AA308589, AI949031, AA132446, AI343648, AA181775, AI435224, AI343775, AA099397, T16045, AI799105, AI752703, W33196, AA351180, AI961827, T33784, AI915117, AW269113, AA534922, T07513, AA640598, AW006679, AI690741, AI360483, AI493458, AA045885, AA806918, AI538745, AA626552, AI222003, AI027680, AW249906, AI081731, AI559452, AI541544, AW015343, AI308205, AA351396, AI749264, AI880176, AA813628, AI272365, AA666167, T08178, AI832597, C03506, AI961596, AW242908, R21336, AW383486, T34813, F05305, Z38330, AI860100, T30202, AA984906, AI669246, AI783574, AA132628, AA679701, T09495, AI804284, AA548605, AI904542, T33720, AI003186, AI689628, AI422626, AW198201, AA343212, T33820, AW237961, AI364459, N83716, AI204432, AI609608, AA766618, AA354129, AF195417, and AL137455.
HSYDB42	646	933545	1 - 936	15 - 950	AI719346, AA310771, AA233019, AA485496, AA411844, AA653679, AI129243, AI589063, AA829388,

					AA830191, AW300947, AI804787, AW206297, AA864496, AA485340, AA411764, AA831521, T47212, R10201, AA853167, AA810264, AA806768, T47213, AW206611, AA601948, R23156, AA483462, AI621256, AW382583, T91085, AW014353, AW069654, AW362889, AW051869, R10100, AL022318, AR037576, U61084, AL022318, AL022318, and AL022318.
HTXKJ79	647	1193059	1 - 1335	15 - 1349	AA313892, AA526825, N93427, AA130211, AA541790, AA513784, AI338742, AI608962, AI188269, AI041177, AI421860, AI857704, AI565802, AI189800, AA133994, AA857480, N92521, AI979046, AW081990, AA479643, AA401099, AA100939, AW131162, AI735040, AA555043, AW072841, AA308103, N35914, AI333478, AA847298, AA477100, AI336156, AA088505, AI160310, AI494501, AI038076, AI672758, AW405000, AA173369, AI333476, AA401012, AI369296, AI126897, AA694227, AA860645, AA149111, AA694117, AA088451, AI749360, AI088643, AA576203, AI718389, F20628, AA287074, F26081, N26049, D20716, AA721698, AA284531, AW273893, N53859, AI469668, AA502645, AI033719, AI420366, F20597, H98101, AI189806, N34652, AI636826, AA064910, AA917751, R98575, AA575937, AA421366, AA935737, W72160, AI186260, N32788, AA477331, AA158600, N31599, AA401100, AI193952, W42983, AI340972, C03853, AA479750, AA564885, AI034254, AI358074, AA992042, AA491987, H70695, N20951, AI128894, AA654495, R80833, AI333433, AA576225, AA421285, AA065189, W02947, AA782455, R92244, AI766437, AA582561, AA782733, AI784600, AA158981, AA035404, AA158621, W00676, H82450, AW191872, AI301326, AI749232, AA484185, H23877, AA890312, AI359315, AA112059, N73359, AA669504, R98056, AI073522, AI129443, N27821, AI689201, AA322157, T29641, H78773, W74603, AA197117, AW004770, AI581927, AA010122, AA035403, AA149110, H47164, R98576, AA664772, AA187062, N49759, R98296, R93304, AW273793, W42984, AW299631, H78692, AA340920, H47080, AA375173, AA121112, N88492, H91239, H65548, F33675, N91473, F36132, AA065188, AA010121, H91185, AA629726, N69009, AA135829, AA345017, N42658, F36640,

					AA380545, AA309814, W04169, AA664655, AA340603, AA635766, AA135830, N67959, AI718859, W38968, R19262, F18056, R11548, AA341429, AA552258, N87271, N87225, N86420, R11537, N70131, AA916347, AA594049, AA778920, AA845634, N83545, AI921962, H23878, N43981, AA886820, AA682552, AA089586, AA400947, AA771861, W21469, AA774487, AI041445, AA448241, T25854, R19273, N47052, AA742719, AA879068, N86264, U09813, and U51167.
HUSGQ19	648	1165320	1 - 1554	15 - 1568	AI866480, AI983534, AL040482, AI333019, AI274967, AW303755, AA206575, N31555, AW452025, AA496999, AA648602, N39479, AA648068, T68311, H95917, AA161418, T51330, AA630664, F37190, AA403243, AA830558, AA489584, AA262117, N98795, AA186599, F28863, N57116, AA595742, AA308992, and AC007450.
HUSZS75	649	1193982	1 - 505	15 - 519	AI598182, AI494294, AI590288, AI084196, AW194590, AI087964, AI198967, AI199039, AI741329, AI869985, AI244677, AI418883, AI089003, AI380816, AW194721, AA604430, W72682, AW292931, AA810856, AI584146, W77788, AI474979, AA994638, AA314116, AW364658, AW364613, and AC004531.
HWBDR25	650	1174365	1 - 1245	15 - 1259	AI214167, T06837, AL041965, T48053, AA706944, AA706964, H47902, AF083255, and AF147429.
HBGSS51	651	954855	1 - 328	15 - 342	AI820875, AW043723, AI733833, AI346364, AI367911, AI339790, AI304423, AI281355, AW002302, AI290437, AI222852, AI222849, AI284996, AI262350, AA377487, AI262351, AI304520, AI337436, AC012615, AC012615, and AC012615.

TABLE 4

Code	Description	Tissue	Organ	Cell Line	Disease	Vector
AR022	a Heart	a Heart				
AR023	a Liver	a Liver				
AR024	a mammary gland	a mammary gland				
AR025	a Prostate	a Prostate				
AR026	a small intestine	a small intestine				
AR027	a Stomach	a Stomach				
AR028	Blood B cells	Blood B cells				
AR029	Blood B cells activated	Blood B cells activated				
AR030	Blood B cells resting	Blood B cells resting				
AR031	Blood T cells activated	Blood T cells activated				
AR032	Blood T cells resting	Blood T cells resting				
AR033	brain	brain				
AR034	breast	breast				
AR035	breast cancer	breast cancer				
AR036	Cell Line CAOV3	Cell Line CAOV3				
AR037	cell line PA-1	cell line PA-1				
AR038	cell line transformed	cell line transformed				
AR039	colon	colon				
AR040	colon (9808co65R)	colon (9808co65R)				
AR041	colon (9809co15)	colon (9809co15)				
AR042	colon cancer	colon cancer				
AR043	colon cancer (9808co64R)	colon cancer (9808co64R)				
AR044	colon cancer 9809co14	colon cancer 9809co14				
AR045	corn clone 5	corn clone 5				
AR046	corn clone 6	corn clone 6				
AR047	corn clone2	corn clone2				
AR048	corn clone3	corn clone3				
AR049	Corn Clone4	Corn Clone4				
AR050	Donor II B Cells 24hrs	Donor II B Cells 24hrs				
AR051	Donor II B Cells 72hrs	Donor II B Cells 72hrs				
AR052	Donor II B-Cells 24 hrs.	Donor II B-Cells 24 hrs.				
AR053	Donor II B-Cells 72hrs	Donor II B-Cells 72hrs				
AR054	Donor II Resting B Cells	Donor II Resting B Cells				
AR055	Heart	Heart				
AR056	Human Lung (clontech)	Human Lung (clontech)				
AR057	Human Mammary (clontech)	Human Mammary (clontech)				
AR058	Human Thymus (clontech)	Human Thymus (clontech)				
AR059	Jurkat (unstimulated)	Jurkat (unstimulated)				
AR060	Kidney	Kidney				
AR061	Liver	Liver				
AR062	Liver (Clontech)	Liver (Clontech)				
AR063	Lymphocytes chronic	Lymphocytes				

	lymphocytic leukaemia	chronic lymphocytic leukaemia				
AR064	Lymphocytes diffuse large B cell lymphoma	Lymphocytes diffuse large B cell lymphoma				
AR065	Lymphocytes follicular lymphoma	Lymphocytes follicular lymphoma				
AR066	normal breast	normal breast				
AR067	Normal Ovarian (4004901)	Normal Ovarian (4004901)				
AR068	Normal Ovary 9508G045	Normal Ovary 9508G045				
AR069	Normal Ovary 9701G208	Normal Ovary 9701G208				
AR070	Normal Ovary 9806G005	Normal Ovary 9806G005				
AR071	Ovarian Cancer	Ovarian Cancer				
AR072	Ovarian Cancer (9702G001)	Ovarian Cancer (9702G001)				
AR073	Ovarian Cancer (9707G029)	Ovarian Cancer (9707G029)				
AR074	Ovarian Cancer (9804G011)	Ovarian Cancer (9804G011)				
AR075	Ovarian Cancer (9806G019)	Ovarian Cancer (9806G019)				
AR076	Ovarian Cancer (9807G017)	Ovarian Cancer (9807G017)				
AR077	Ovarian Cancer (9809G001)	Ovarian Cancer (9809G001)				
AR078	ovarian cancer 15799	ovarian cancer 15799				
AR079	Ovarian Cancer 17717AID	Ovarian Cancer 17717AID				
AR080	Ovarian Cancer 4004664B1	Ovarian Cancer 4004664B1				
AR081	Ovarian Cancer 4005315A1	Ovarian Cancer 4005315A1				
AR082	ovarian cancer 94127303	ovarian cancer 94127303				
AR083	Ovarian Cancer 96069304	Ovarian Cancer 96069304				
AR084	Ovarian Cancer 9707G029	Ovarian Cancer 9707G029				
AR085	Ovarian Cancer 9807G045	Ovarian Cancer 9807G045				
AR086	ovarian cancer 9809G001	ovarian cancer 9809G001				
AR087	Ovarian Cancer 9905C032RC	Ovarian Cancer 9905C032RC				
AR088	Ovarian cancer 9907 C00 3rd	Ovarian cancer 9907 C00 3rd				
AR089	Prostate	Prostate				
AR090	Prostate (clonotech)	Prostate (clonotech)				
AR091	prostate cancer	prostate cancer				
AR092	prostate cancer #15176	prostate cancer #15176				
AR093	prostate cancer #15509	prostate cancer #15509				
AR094	prostate cancer #15673	prostate cancer #15673				
AR095	Small Intestine (Clontech)	Small Intestine (Clontech)				

AR096	Spleen	Spleen				
AR097	Thymus T cells activated	Thymus T cells activated				
AR098	Thymus T cells resting	Thymus T cells resting				
AR099	Tonsil	Tonsil				
AR100	Tonsil germinal center centroblast	Tonsil germinal center centroblast				
AR101	Tonsil germinal center B cell	Tonsil germinal center B cell				
AR102	Tonsil lymph node	Tonsil lymph node				
AR103	Tonsil memory B cell	Tonsil memory B cell				
AR104	Whole Brain	Whole Brain				
AR105	Xenograft ES-2	Xenograft ES-2				
AR106	Xenograft SW626	Xenograft SW626				
H0002	Human Adult Heart	Human Adult Heart	Heart			Uni-ZAP XR
H0003	Human Adult Liver	Human Adult Liver	Liver			Uni-ZAP XR
H0004	Human Adult Spleen	Human Adult Spleen	Spleen			Uni-ZAP XR
H0008	Whole 6 Week Old Embryo					Uni-ZAP XR
H0009	Human Fetal Brain					Uni-ZAP XR
H0011	Human Fetal Kidney	Human Fetal Kidney	Kidney			Uni-ZAP XR
H0012	Human Fetal Kidney	Human Fetal Kidney	Kidney			Uni-ZAP XR
H0013	Human 8 Week Whole Embryo	Human 8 Week Old Embryo	Embryo			Uni-ZAP XR
H0014	Human Gall Bladder	Human Gall Bladder	Gall Bladder			Uni-ZAP XR
H0015	Human Gall Bladder, fraction II	Human Gall Bladder	Gall Bladder			Uni-ZAP XR
H0018	Human Greater Omentum, fII remake	Human Greater Omentum	peritoneum			Uni-ZAP XR
H0019	Human Fetal Heart	Human Fetal Heart	Heart			pBluescript
H0020	Human Hippocampus	Human Hippocampus	Brain			Uni-ZAP XR
H0022	Jurkat Cells	Jurkat T-Cell Line				Lambda ZAP II
H0023	Human Fetal Lung					Uni-ZAP XR
H0024	Human Fetal Lung III	Human Fetal Lung	Lung			Uni-ZAP XR
H0026	Namalwa Cells	Namalwa B-Cell Line, EBV immortalized				Lambda ZAP II
H0027	Human Ovarian Cancer				disease	Uni-ZAP XR
H0028	Human Old Ovary	Human Old Ovary	Ovary			pBluescript
H0030	Human Placenta					Uni-ZAP XR
H0031	Human Placenta	Human Placenta	Placenta			Uni-ZAP XR
H0032	Human Prostate	Human Prostate	Prostate			Uni-ZAP XR
H0033	Human Pituitary	Human Pituitary				Uni-ZAP XR
H0035	Human Salivary Gland	Human Salivary Gland	Salivary gland			Uni-ZAP XR
H0036	Human Adult Small Intestine	Human Adult Small Intestine	Small Int.			Uni-ZAP XR
H0037	Human Adult Small Intestine	Human Adult Small Intestine	Small Int.			pBluescript
H0038	Human Testes	Human Testes	Testis			Uni-ZAP XR
H0039	Human Pancreas Tumor	Human Pancreas Tumor	Pancreas		disease	Uni-ZAP XR
H0040	Human Testes Tumor	Human Testes Tumor	Testis		disease	Uni-ZAP XR
H0041	Human Fetal Bone	Human Fetal Bone	Bone			Uni-ZAP XR
H0042	Human Adult Pulmonary	Human Adult Pulmonary	Lung			Uni-ZAP XR

H0046	Human Endometrial Tumor	Human Endometrial Tumor	Uterus		disease	Uni-ZAP XR
H0047	Human Fetal Liver	Human Fetal Liver	Liver			Uni-ZAP XR
H0049	Human Fetal Kidney	Human Fetal Kidney	Kidney			Uni-ZAP XR
H0050	Human Fetal Heart	Human Fetal Heart	Heart			Uni-ZAP XR
H0051	Human Hippocampus	Human Hippocampus	Brain			Uni-ZAP XR
H0052	Human Cerebellum	Human Cerebellum	Brain			Uni-ZAP XR
H0056	Human Umbilical Vein, Endo. remake	Human Umbilical Vein Endothelial Cells	Umbilical vein			Uni-ZAP XR
H0057	Human Fetal Spleen					Uni-ZAP XR
H0058	Human Thymus Tumor	Human Thymus Tumor	Thymus		disease	Lambda ZAP II
H0059	Human Uterine Cancer	Human Uterine Cancer	Uterus		disease	Lambda ZAP II
H0060	Human Macrophage	Human Macrophage	Blood	Cell Line		pBluescript
H0061	Human Macrophage	Human Macrophage	Blood	Cell Line		pBluescript
H0063	Human Thymus	Human Thymus	Thymus			Uni-ZAP XR
H0068	Human Skin Tumor	Human Skin Tumor	Skin		disease	Uni-ZAP XR
H0069	Human Activated T-Cells	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0070	Human Pancreas	Human Pancreas	Pancreas			Uni-ZAP XR
H0071	Human Infant Adrenal Gland	Human Infant Adrenal Gland	Adrenal gland			Uni-ZAP XR
H0079	Human Whole 7 Week Old Embryo (II)	Human Whole 7 Week Old Embryo	Embryo			Uni-ZAP XR
H0080	Human Whole 6 Week Old Embryo (II)	Human Whole Six Week Old Embryo	Embryo			Lambda ZAP II
H0081	Human Fetal Epithelium (Skin)	Human Fetal Skin	Skin			Uni-ZAP XR
H0083	HUMAN JURKAT MEMBRANE BOUND POLYSOMES	Jurkat Cells				Uni-ZAP XR
H0085	Human Colon	Human Colon				Lambda ZAP II
H0086	Human epithelioid sarcoma	Epithelioid Sarcoma, muscle	Sk Muscle		disease	Uni-ZAP XR
H0087	Human Thymus	Human Thymus				pBluescript
H0090	Human T-Cell Lymphoma	T-Cell Lymphoma	T-Cell		disease	Uni-ZAP XR
H0096	Human Parotid Cancer	Human Parotid Cancer	Parotid		disease	Lambda ZAP II
H0097	Human Adult Heart, subtracted	Human Adult Heart	Heart			pBluescript
H0098	Human Adult Liver, subtracted	Human Adult Liver	Liver			Uni-ZAP XR
H0099	Human Lung Cancer, subtracted	Human Lung Cancer	Lung			pBluescript
H0100	Human Whole Six Week Old Embryo	Human Whole Six Week Old Embryo	Embryo			Uni-ZAP XR
H0101	Human 7 Weeks Old Embryo, subtracted	Human Whole 7 Week Old Embryo	Embryo			Lambda ZAP II
H0102	Human Whole 6 Week Old Embryo (II), subt	Human Whole Six Week Old Embryo	Embryo			pBluescript
H0105	Human Fetal Heart, subtracted	Human Fetal Heart	Heart			pBluescript
H0107	Human Infant Adrenal Gland, subtracted	Human Infant Adrenal Gland	Adrenal gland			pBluescript
H0109	Human Macrophage, subtracted	Macrophage	Blood	Cell Line		pBluescript
H0111	Human Placenta, subtracted	Human Placenta	Placenta			pBluescript
H0116	Human Thymus Tumor,	Human Thymus	Thymus			pBluescript

	subtracted	Tumor				
H0119	Human Pediatric Kidney	Human Pediatric Kidney	Kidney			Uni-ZAP XR
H0121	Human Cornea, subtracted	Human Cornea	eye			Uni-ZAP XR
H0122	Human Adult Skeletal Muscle	Human Skeletal Muscle	Sk Muscle			Uni-ZAP XR
H0123	Human Fetal Dura Mater	Human Fetal Dura Mater	Brain			Uni-ZAP XR
H0124	Human Rhabdomyosarcoma	Human Rhabdomyosarcoma	Sk Muscle		disease	Uni-ZAP XR
H0125	Cem cells cyclohexamide treated	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		Uni-ZAP XR
H0129	Jurkat cells, thiouridine activated, fract II	Jurkat Cells				Uni-ZAP XR
H0130	LNCAP untreated	LNCAP Cell Line	Prostate	Cell Line		Uni-ZAP XR
H0131	LNCAP + 0.3nM R1881	LNCAP Cell Line	Prostate	Cell Line		Uni-ZAP XR
H0132	LNCAP + 30nM R1881	LNCAP Cell Line	Prostate	Cell Line		Uni-ZAP XR
H0134	Raji Cells, cyclohexamide treated	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		Uni-ZAP XR
H0135	Human Synovial Sarcoma	Human Synovial Sarcoma	Synovium			Uni-ZAP XR
H0136	Supt Cells, cyclohexamide treated	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		Uni-ZAP XR
H0140	Activated T-Cells, 8 hrs.	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0141	Activated T-Cells, 12 hrs.	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0144	Nine Week Old Early Stage Human	9 Wk Old Early Stage Human	Embryo			Uni-ZAP XR
H0149	7 Week Old Early Stage Human, subtracted	Human Whole 7 Week Old Embryo	Embryo			Uni-ZAP XR
H0150	Human Epididymus	Epididymis	Testis			Uni-ZAP XR
H0154	Human Fibrosarcoma	Human Skin Fibrosarcoma	Skin		disease	Uni-ZAP XR
H0156	Human Adrenal Gland Tumor	Human Adrenal Gland Tumor	Adrenal Gland		disease	Uni-ZAP XR
H0159	Activated T-Cells, 8 hrs., ligation 2	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0161	Activated T-Cells, 24 hrs., ligation 2	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0163	Human Synovium	Human Synovium	Synovium			Uni-ZAP XR
H0164	Human Trachea Tumor	Human Trachea Tumor	Trachea		disease	Uni-ZAP XR
H0165	Human Prostate Cancer, Stage B2	Human Prostate Cancer, stage B2	Prostate		disease	Uni-ZAP XR
H0166	Human Prostate Cancer, Stage B2 fraction	Human Prostate Cancer, stage B2	Prostate		disease	Uni-ZAP XR
H0168	Human Prostate Cancer, Stage C	Human Prostate Cancer, stage C	Prostate		disease	Uni-ZAP XR
H0169	Human Prostate Cancer, Stage C fraction	Human Prostate Cancer, stage C	Prostate		disease	Uni-ZAP XR
H0170	12 Week Old Early Stage Human	Twelve Week Old Early Stage Human	Embryo			Uni-ZAP XR
H0171	12 Week Old Early Stage Human, II	Twelve Week Old Early Stage Human	Embryo			Uni-ZAP XR
H0172	Human Fetal Brain, random primed	Human Fetal Brain	Brain			Lambda ZAP II
H0173	Human Cardiomyopathy, RNA remake	Human Cardiomyopathy	Heart		disease	Uni-ZAP XR
H0175	H. Adult Spleen, ziplox					pSport1
H0177	CAMA1Ee Cell Line	CAMA1Ee Cell	Breast	Cell Line		Uni-ZAP XR

		Line				
H0178	Human Fetal Brain	Human Fetal Brain	Brain			Uni-ZAP XR
H0179	Human Neutrophil	Human Neutrophil	Blood	Cell Line		Uni-ZAP XR
H0181	Human Primary Breast Cancer	Human Primary Breast Cancer	Breast		disease	Uni-ZAP XR
H0182	Human Primary Breast Cancer	Human Primary Breast Cancer	Breast		disease	Uni-ZAP XR
H0184	Human Colon Cancer, metastasized to liver	Human Colon Cancer, metastasized to liver	Liver		disease	Lambda ZAP II
H0186	Activated T-Cell	T-Cells	Blood	Cell Line		Lambda ZAP II
H0187	Resting T-Cell	T-Cells	Blood	Cell Line		Lambda ZAP II
H0188	Human Normal Breast	Human Normal Breast	Breast			Uni-ZAP XR
H0189	Human Resting Macrophage	Human Macrophage/Monocytes	Blood	Cell Line		Uni-ZAP XR
H0190	Human Activated Macrophage (LPS)	Human Macrophage/Monocytes	Blood	Cell Line		Uni-ZAP XR
H0191	Human Activated Macrophage (LPS), thiour	Human Macrophage/Monocytes	Blood	Cell Line		Uni-ZAP XR
H0192	Cem Cells, cyclohexamide treated, subtra	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		Uni-ZAP XR
H0194	Human Cerebellum, subtracted	Human Cerebellum	Brain			pBluescript
H0196	Human Cardiomyopathy, subtracted	Human Cardiomyopathy	Heart			Uni-ZAP XR
H0197	Human Fetal Liver, subtracted	Human Fetal Liver	Liver			Uni-ZAP XR
H0199	Human Fetal Liver, subtracted, neg clone	Human Fetal Liver	Liver			Uni-ZAP XR
H0200	Human Greater Omentum, fract II remake,	Human Greater Omentum	peritoneum			Uni-ZAP XR
H0201	Human Hippocampus, subtracted	Human Hippocampus	Brain			pBluescript
H0204	Human Colon Cancer, subtracted	Human Colon Cancer	Colon			pBluescript
H0207	LNCAP, differential expression	LNCAP Cell Line	Prostate	Cell Line		pBluescript
H0208	Early Stage Human Lung, subtracted	Human Fetal Lung	Lung			pBluescript
H0212	Human Prostate, subtracted	Human Prostate	Prostate			pBluescript
H0213	Human Pituitary, subtracted	Human Pituitary				Uni-ZAP XR
H0214	Raji cells, cyclohexamide treated, subtracted	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		pBluescript
H0216	Supt cells, cyclohexamide treated, subtracted	Cyclohexamide Treated Cem, Jurkat, Raji, and Supt	Blood	Cell Line		pBluescript
H0220	Activated T-Cells, 4 hrs, subtracted	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0221	Activated T-Cells, 4 hrs, differentially expressed	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0224	Activated T-Cells, 12 hrs, subtracted	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0229	Early Stage Human Brain,	Early Stage Human	Brain			Lambda

	random primed	Brain				ZAP II
H0230	Human Cardiomyopathy, diff exp	Human Cardiomyopathy	Heart		disease	Uni-ZAP XR
H0231	Human Colon, subtraction	Human Colon				pBluescript
H0232	Human Colon, differential expression	Human Colon				pBluescript
H0234	human colon cancer, metastatic to liver, differentially expressed	Human Colon Cancer, metastasized to liver	Liver			pBluescript
H0239	Human Kidney Tumor	Human Kidney Tumor	Kidney		disease	Uni-ZAP XR
H0240	C7MCF7 cell line, estrogen treated, Differential	C7MCF7 Cell Line, estrogen treated	Breast	Cell Line		Uni-ZAP XR
H0241	C7MCF7 cell line, estrogen treated, subtraction	C7MCF7 Cell Line, estrogen treated	Breast	Cell Line		Uni-ZAP XR
H0242	Human Fetal Heart, Differential (Fetal-Specific)	Human Fetal Heart	Heart			pBluescript
H0244	Human 8 Week Whole Embryo, subtracted	Human 8 Week Old Embryo	Embryo			Uni-ZAP XR
H0245	Human 8 Week Whole Embryo, differential	Human 8 Week Old Embryo	Embryo			Uni-ZAP XR
H0246	Human Fetal Liver-Enzyme subtraction	Human Fetal Liver	Liver			Uni-ZAP XR
H0247	Human Membrane Bound Polysomes- Enzyme Subtraction	Human Membrane Bound Polysomes	Blood	Cell Line		Uni-ZAP XR
H0249	HE7, subtracted by hybridization with E7 cDNA	Human Whole 7 Week Old Embryo	Embryo			Uni-ZAP XR
H0250	Human Activated Monocytes	Human Monocytes				Uni-ZAP XR
H0251	Human Chondrosarcoma	Human Chondrosarcoma	Cartilage		disease	Uni-ZAP XR
H0252	Human Osteosarcoma	Human Osteosarcoma	Bone		disease	Uni-ZAP XR
H0253	Human adult testis, large inserts	Human Adult Testis	Testis			Uni-ZAP XR
H0254	Breast Lymph node cDNA library	Breast Lymph Node	Lymph Node			Uni-ZAP XR
H0255	breast lymph node CDNA library	Breast Lymph Node	Lymph Node			Lambda ZAP II
H0256	HL-60, unstimulated	Human HL-60 Cells, unstimulated	Blood	Cell Line		Uni-ZAP XR
H0257	HL-60, PMA 4H	HL-60 Cells, PMA stimulated 4H	Blood	Cell Line		Uni-ZAP XR
H0261	H. cerebellum, Enzyme subtracted	Human Cerebellum	Brain			Uni-ZAP XR
H0263	human colon cancer	Human Colon Cancer	Colon		disease	Lambda ZAP II
H0264	human tonsils	Human Tonsil	Tonsil			Uni-ZAP XR
H0265	Activated T-Cell (12hs)/Thiouridine labelledEco	T-Cells	Blood	Cell Line		Uni-ZAP XR
H0266	Human Microvascular Endothelial Cells, fract. A	HMEC	Vein	Cell Line		Lambda ZAP II
H0267	Human Microvascular Endothelial Cells, fract. B	HMEC	Vein	Cell Line		Lambda ZAP II
H0268	Human Umbilical Vein Endothelial Cells, fract. A	HUVE Cells	Umbilical vein	Cell Line		Lambda ZAP II
H0269	Human Umbilical Vein	HUVE Cells	Umbilical	Cell Line		Lambda

	Endothelial Cells, fract. B		vein			ZAP II
H0270	HPAS (human pancreas, subtracted)	Human Pancreas	Pancreas			Uni-ZAP XR
H0271	Human Neutrophil, Activated	Human Neutrophil - Activated	Blood	Cell Line		Uni-ZAP XR
H0272	HUMAN TONSILS, FRACTION 2	Human Tonsil	Tonsil			Uni-ZAP XR
H0274	Human Adult Spleen, fraction II	Human Adult Spleen	Spleen			Uni-ZAP XR
H0275	Human Infant Adrenal Gland, Subtracted	Human Infant Adrenal Gland	Adrenal gland			pBluescript
H0280	K562 + PMA (36 hrs)	K562 Cell line	cell line	Cell Line		ZAP Express
H0282	HBGB's differential consolidation	Human Primary Breast Cancer	Breast			Uni-ZAP XR
H0284	Human OB MG63 control fraction I	Human Osteoblastoma MG63 cell line	Bone	Cell Line		Uni-ZAP XR
H0286	Human OB MG63 treated (10 nM E2) fraction I	Human Osteoblastoma MG63 cell line	Bone	Cell Line		Uni-ZAP XR
H0288	Human OB HOS control fraction I	Human Osteoblastoma HOS cell line	Bone	Cell Line		Uni-ZAP XR
H0290	Human OB HOS treated (1 nM E2) fraction I	Human Osteoblastoma HOS cell line	Bone	Cell Line		Uni-ZAP XR
H0292	Human OB HOS treated (10 nM E2) fraction I	Human Osteoblastoma HOS cell line	Bone	Cell Line		Uni-ZAP XR
H0293	WI 38 cells					Uni-ZAP XR
H0294	Amniotic Cells - TNF induced	Amniotic Cells - TNF induced	Placenta	Cell Line		Uni-ZAP XR
H0295	Amniotic Cells - Primary Culture	Amniotic Cells - Primary Culture	Placenta	Cell Line		Uni-ZAP XR
H0305	CD34 positive cells (Cord Blood)	CD34 Positive Cells	Cord Blood			ZAP Express
H0306	CD34 depleted Buffy Coat (Cord Blood)	CD34 Depleted Buffy Coat (Cord Blood)	Cord Blood			ZAP Express
H0309	Human Chronic Synovitis	Synovium, Chronic Synovitis/ Osteoarthritis	Synovium		disease	Uni-ZAP XR
H0310	human caudate nucleus	Brain	Brain			Uni-ZAP XR
H0316	HUMAN STOMACH	Human Stomach	Stomach			Uni-ZAP XR
H0318	HUMAN B CELL LYMPHOMA	Human B Cell Lymphoma	Lymph Node		disease	Uni-ZAP XR
H0321	HUMAN SCHWANOMA	Schwannoma	Nerve		disease	Uni-ZAP XR
H0327	human corpus callosum	Human Corpus Callosum	Brain			Uni-ZAP XR
H0328	human ovarian cancer	Ovarian Cancer	Ovary		disease	Uni-ZAP XR
H0329	Dermatofibrosarcoma Protuberance	Dermatofibrosarcoma Protuberans	Skin		disease	Uni-ZAP XR
H0331	Hepatocellular Tumor	Hepatocellular Tumor	Liver		disease	Lambda ZAP II
H0333	Hemangiopericytoma	Hemangiopericytoma	Blood vessel		disease	Lambda ZAP II
H0334	Kidney cancer	Kidney Cancer	Kidney		disease	Uni-ZAP XR
H0339	Duodenum	Duodenum				Uni-ZAP XR
H0340	Corpus Callosum	Corpus Callosum-93052				Uni-ZAP XR
H0341	Bone Marrow Cell Line (RS4;11)	Bone Marrow Cell Line RS4;11	Bone Marrow	Cell Line		Uni-ZAP XR

H0343	stomach cancer (human)	Stomach Cancer - 5383A (human)			disease	Uni-ZAP XR
H0344	Adipose tissue (human)	Adipose - 6825A (human)				Uni-ZAP XR
H0346	Brain-medulloblastoma	Brain (Medulloblastoma)- 9405C006R	Brain		disease	Uni-ZAP XR
H0349	human adult liver cDNA library	Human Adult Liver	Liver			pCMVSPORT 1
H0351	Glioblastoma	Glioblastoma	Brain		disease	Uni-ZAP XR
H0352	wilm's tumor	Wilm's Tumor			disease	Uni-ZAP XR
H0354	Human Leukocytes	Human Leukocytes	Blood	Cell Line		pCMVSPORT 1
H0355	Human Liver	Human Liver, normal Adult				pCMVSPORT 1
H0356	Human Kidney	Human Kidney	Kidney			pCMVSPORT 1
H0357	H. Normalized Fetal Liver, II	Human Fetal Liver	Liver			Uni-ZAP XR
H0359	KMH2 cell line	KMH2				ZAP Express
H0361	Human rejected kidney	Human Rejected Kidney			disease	pBluescript
H0364	Human Osteoclastoma, excised	Human Osteoclastoma			disease	pBluescript
H0365	Osteoclastoma-normalized B	Human Osteoclastoma			disease	Uni-ZAP XR
H0366	L428 cell line	L428				ZAP Express
H0369	H. Atrophic Endometrium	Atrophic Endometrium and myometrium				Uni-ZAP XR
H0370	H. Lymph node breast Cancer	Lymph node with Met. Breast Cancer			disease	Uni-ZAP XR
H0373	Human Heart	Human Adult Heart	Heart			pCMVSPORT 1
H0374	Human Brain	Human Brain				pCMVSPORT 1
H0375	Human Lung	Human Lung				pCMVSPORT 1
H0376	Human Spleen	Human Adult Spleen	Spleen			pCMVSPORT 1
H0379	Human Tongue, frac 1	Human Tongue				pSport1
H0380	Human Tongue, frac 2	Human Tongue				pSport1
H0381	Bone Cancer	Bone Cancer			disease	Uni-ZAP XR
H0383	Human Prostate BPH, re-excision	Human Prostate BPH				Uni-ZAP XR
H0388	Human Rejected Kidney, 704 re-excision	Human Rejected Kidney			disease	pBluescript
H0390	Human Amygdala Depression, re-excision	Human Amygdala Depression			disease	pBluescript
H0391	H. Meningioma, M6	Human Meningioma	brain			pSport1
H0392	H. Meningioma, M1	Human Meningioma	brain			pSport1
H0393	Fetal Liver, subtraction II	Human Fetal Liver	Liver			pBluescript
H0394	A-14 cell line	Redd-Sternberg cell				ZAP Express
H0395	A1-CELL LINE	Redd-Sternberg cell				ZAP Express
H0396	L1 Cell line	Redd-Sternberg cell				ZAP Express
H0399	Human Kidney Cortex, re-rescue	Human Kidney Cortex				Lambda ZAP II
H0400	Human Striatum Depression, re-rescue	Human Brain, Striatum Depression	Brain			Lambda ZAP II
H0401	Human Pituitary, subtracted V	Human Pituitary				pBluescript
H0402	CD34 depleted Buffy Coat	CD34 Depleted	Cord Blood			ZAP Express

	(Cord Blood), re-excision	Buffy Coat (Cord Blood)				
H0403	H. Umbilical Vein Endothelial Cells, IL4 induced	HUVE Cells	Umbilical vein	Cell Line		Uni-ZAP XR
H0404	H. Umbilical Vein endothelial cells, uninduced	HUVE Cells	Umbilical vein	Cell Line		Uni-ZAP XR
H0408	Human kidney Cortex, subtracted	Human Kidney Cortex				pBluescript
H0409	H. Striatum Depression, subtracted	Human Brain, Striatum Depression	Brain			pBluescript
H0411	H Female Bladder, Adult	Human Female Adult Bladder	Bladder			pSport1
H0412	Human umbilical vein endothelial cells, IL-4 induced	HUVE Cells	Umbilical vein	Cell Line		pSport1
H0413	Human Umbilical Vein Endothelial Cells, uninduced	HUVE Cells	Umbilical vein	Cell Line		pSport1
H0415	H. Ovarian Tumor, II, OV5232	Ovarian Tumor, OV5232	Ovary		disease	pCMVSPORT 2.0
H0416	Human Neutrophils, Activated, re-excision	Human Neutrophil - Activated	Blood	Cell Line		pBluescript
H0417	Human Pituitary, subtracted VIII	Human Pituitary				pBluescript
H0419	Bone Cancer, re-excision	Bone Cancer				Uni-ZAP XR
H0421	Human Bone Marrow, re-excision	Bone Marrow				pBluescript
H0422	T-Cell PHA 16 hrs	T-Cells	Blood	Cell Line		pSport1
H0423	T-Cell PHA 24 hrs	T-Cells	Blood	Cell Line		pSport1
H0424	Human Pituitary, subt IX	Human Pituitary				pBluescript
H0427	Human Adipose	Human Adipose, left hiplipoma				pSport1
H0428	Human Ovary	Human Ovary Tumor	Ovary			pSport1
H0429	K562 + PMA (36 hrs), re-excision	K562 Cell line	cell line	Cell Line		ZAP Express
H0431	H. Kidney Medulla, re-excision	Kidney medulla	Kidney			pBluescript
H0433	Human Umbilical Vein Endothelial cells, frac B, re-excision	HUVE Cells	Umbilical vein	Cell Line		pBluescript
H0434	Human Brain, striatum, re-excision	Human Brain, Striatum				pBluescript
H0435	Ovarian Tumor 10-3-95	Ovarian Tumor, OV350721	Ovary			pCMVSPORT 2.0
H0436	Resting T-Cell Library, II	T-Cells	Blood	Cell Line		pSport1
H0437	H Umbilical Vein Endothelial Cells, frac A, re-excision	HUVE Cells	Umbilical vein	Cell Line		Lambda ZAP II
H0438	H. Whole Brain #2, re-excision	Human Whole Brain #2				ZAP Express
H0440	FGF enriched mixed library	Mixed libraries				pCMVSPORT 1
H0441	H. Kidney Cortex, subtracted	Kidney cortex	Kidney			pBluescript
H0443	H. Adipose, subtracted	Human Adipose, left hiplipoma				pSport1
H0444	Spleen metastatic melanoma	Spleen, Metastatic malignant melanoma	Spleen		disease	pSport1
H0445	Spleen, Chronic	Human Spleen, CLL	Spleen		disease	pSport1

	lymphocytic leukemia					
H0448	Salivary gland, subtracted	Human Salivary Gland	Salivary gland			Lambda ZAP II
H0449	CD34+ cell, I	CD34 positive cells				pSport1
H0453	H. Kidney Pyramid, subtracted	Kidney pyramids	Kidney			pBluescript
H0455	H. Striatum Depression, sub	Human Brain, Striatum Depression	Brain			pBluescript
H0456	H Kidney Cortex, subtracted III	Human Kidney Cortex				pBluescript .
H0457	Human Eosinophils	Human Eosinophils				pSport1
H0458	CD34+ cell, I, frac II	CD34 positive cells				pSport1
H0459	CD34+cells, II, FRACTION 2	CD34 positive cells				pCMVSPORT 2.0
H0477	Human Tonsil, Lib 3	Human Tonsil	Tonsil			pSport1
H0478	Salivary Gland, Lib 2	Human Salivary Gland	Salivary gland			pSport1
H0479	Salivary Gland, Lib 3	Human Salivary Gland	Salivary gland			pSport1
H0483	Breast Cancer cell line, MDA 36	Breast Cancer Cell line, MDA 36				pSport1
H0484	Breast Cancer Cell line, angiogenic	Breast Cancer Cell line, Angiogenic, 36T3				pSport1
H0485	Hodgkin's Lymphoma I	Hodgkin's Lymphoma I			disease	pCMVSPORT 2.0
H0486	Hodgkin's Lymphoma II	Hodgkin's Lymphoma II			disease	pCMVSPORT 2.0
H0487	Human Tonsils, lib I	Human Tonsils				pCMVSPORT 2.0
H0488	Human Tonsils, Lib 2	Human Tonsils				pCMVSPORT 2.0
H0489	Crohn's Disease	Ileum	Intestine		disease	pSport1
H0492	HL-60, RA 4h, Subtracted	HL-60 Cells, RA stimulated for 4H	Blood	Cell Line		Uni-ZAP XR
H0494	Keratinocyte	Keratinocyte				pCMVSPORT 2.0
H0497	HEL cell line	HEL cell line		HEL 92.1.7		pSport1
H0505	Human Astrocyte	Human Astrocyte				pSport1
H0506	Ulcerative Colitis	Colon	Colon			pSport1
H0509	Liver, Hepatoma	Human Liver, Hepatoma, patient 8	Liver		disease	pCMVSPORT 3.0
H0510	Human Liver, normal	Human Liver, normal, Patient # 8	Liver			pCMVSPORT 3.0
H0512	Keratinocyte, lib 3	Keratinocyte				pCMVSPORT 2.0
H0517	Nasal polyps	Nasal polyps				pCMVSPORT 2.0
H0518	pBMC stimulated w/ poly I/C	pBMC stimulated with poly I/C				pCMVSPORT 3.0
H0519	NTERA2, control	NTERA2, Teratocarcinoma cell line				pCMVSPORT 3.0
H0520	NTERA2 + retinoic acid, 14 days	NTERA2, Teratocarcinoma cell line				pSport1
H0521	Primary Dendritic Cells, lib 1	Primary Dendritic cells				pCMVSPORT 3.0
H0522	Primary Dendritic cells, frac 2	Primary Dendritic cells				pCMVSPORT 3.0
H0525	PCR, pBMC I/C treated	pBMC stimulated				PCR II

		with poly I/C				
H0528	Poly[I]/Poly[C] Normal Lung Fibroblasts	Poly[I]/Poly[C] Normal Lung Fibroblasts				pCMVSPORT 3.0
H0529	Myeloid Progenitor Cell Line	TF-1 Cell Line; Myeloid progenitor cell line				pCMVSPORT 3.0
H0530	Human Dermal Endothelial Cells, untreated	Human Dermal Endothelial Cells; untreated				pSport1
H0535	Human ovary tumor cell OV350721	Ovarian Tumor, OV350721	Ovary		disease	pSport1
H0537	H. Primary Dendritic Cells, lib 3	Primary Dendritic cells				pCMVSPORT 2.0
H0538	Merkel Cells	Merkel cells	Lymph node			pSport1
H0539	Pancreas Islet Cell Tumor	Pancreas Islet Cell Tumour	Pancreas		disease	pSport1
H0540	Skin, burned	Skin, leg burned	Skin			pSport1
H0542	T Cell helper I	Helper T cell				pCMVSPORT 3.0
H0543	T cell helper II	Helper T cell				pCMVSPORT 3.0
H0544	Human endometrial stromal cells	Human endometrial stromal cells				pCMVSPORT 3.0
H0545	Human endometrial stromal cells-treated with progesterone	Human endometrial stromal cells-treated with proge				pCMVSPORT 3.0
H0546	Human endometrial stromal cells-treated with estradiol	Human endometrial stromal cells-treated with estra				pCMVSPORT 3.0
H0547	NTERA2 teratocarcinoma cell line+retinoic acid (14 days)	NTERA2, Teratocarcinoma cell line				pSport1
H0549	H. Epididymus, caput & corpus	Human Epididymus, caput and corpus				Uni-ZAP XR
H0550	H. Epididymus, cauda	Human Epididymus, cauda				Uni-ZAP XR
H0551	Human Thymus Stromal Cells	Human Thymus Stromal Cells				pCMVSPORT 3.0
H0553	Human Placenta	Human Placenta				pCMVSPORT 3.0
H0555	Rejected Kidney, lib 4	Human Rejected Kidney	Kidney		disease	pCMVSPORT 3.0
H0556	Activated T-cell(12h)/Thiouridine-re-excision	T-Cells	Blood	Cell Line		Uni-ZAP XR
H0559	HL-60, PMA 4H, re-excision	HL-60 Cells, PMA stimulated 4H	Blood	Cell Line		Uni-ZAP XR
H0560	KMH2	KMH2				pCMVSPORT 3.0
H0561	L428	L428				pCMVSPORT 3.0
H0565	HUMAN Fetal Brain, normalized 100024F	Human Fetal Brain				pCMVSPORT 2.0
H0567	Human Fetal Brain, normalized A5002F	Human Fetal Brain				pCMVSPORT 2.0
H0569	Human Fetal Brain, normalized CO	Human Fetal Brain				pCMVSPORT 2.0
H0571	Human Fetal Brain, normalized C500HE	Human Fetal Brain				pCMVSPORT 2.0
H0572	Human Fetal Brain, normalized AC5002	Human Fetal Brain				pCMVSPORT 2.0

H0574	Hepatocellular Tumor; re-excision	Hepatocellular Tumor	Liver		disease	Lambda ZAP II
H0575	Human Adult Pulmonary; re-excision	Human Adult Pulmonary	Lung			Uni-ZAP XR
H0576	Resting T-Cell; re-excision	T-Cells	Blood	Cell Line		Lambda ZAP II
H0578	Human Fetal Thymus	Fetal Thymus	Thymus			pSport1
H0579	Pericardium	Pericardium	Heart			pSport1
H0580	Dendritic cells, pooled	Pooled dendritic cells				pCMVSPORT 3.0
H0581	Human Bone Marrow, treated	Human Bone Marrow	Bone Marrow			pCMVSPORT 3.0
H0583	B Cell lymphoma	B Cell Lymphoma	B Cell		disease	pCMVSPORT 3.0
H0584	Activated T-cells, 24 hrs, re-excision	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0585	Activated T-Cells, 12 hrs, re-excision	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0586	Healing groin wound, 6.5 hours post incision	healing groin wound, 6.5 hours post incision - 2/	groin		disease	pCMVSPORT 3.0
H0587	Healing groin wound; 7.5 hours post incision	Groin-2/19/97	groin		disease	pCMVSPORT 3.0
H0589	CD34 positive cells (cord blood), re-ex	CD34 Positive Cells	Cord Blood			ZAP Express
H0590	Human adult small intestine, re-excision	Human Adult Small Intestine	Small Int.			Uni-ZAP XR
H0591	Human T-cell lymphoma; re-excision	T-Cell Lymphoma	T-Cell		disease	Uni-ZAP XR
H0592	Healing groin wound - zero hr post-incision (control)	HGS wound healing project; abdomen			disease	pCMVSPORT 3.0
H0593	Olfactory epithelium; nasal cavity	Olfactory epithelium from roof of left nasal cavity				pCMVSPORT 3.0
H0594	Human Lung Cancer; re-excision	Human Lung Cancer	Lung		disease	Lambda ZAP II
H0595	Stomach cancer (human); re-excision	Stomach Cancer - 5383A (human)			disease	Uni-ZAP XR
H0596	Human Colon Cancer; re-excision	Human Colon Cancer	Colon			Lambda ZAP II
H0597	Human Colon; re-excision	Human Colon				Lambda ZAP II
H0598	Human Stomach; re-excision	Human Stomach	Stomach			Uni-ZAP XR
H0599	Human Adult Heart; re-excision	Human Adult Heart	Heart			Uni-ZAP XR
H0600	Healing Abdomen wound; 70&90 min post incision	Abdomen			disease	pCMVSPORT 3.0
H0601	Healing Abdomen Wound; 15 days post incision	Abdomen			disease	pCMVSPORT 3.0
H0602	Healing Abdomen Wound; 21&29 days post incision	Abdomen			disease	pCMVSPORT 3.0
H0604	Human Pituitary, re-excision	Human Pituitary				pBluescript
H0606	Human Primary Breast Cancer; re-excision	Human Primary Breast Cancer	Breast		disease	Uni-ZAP XR
H0608	H. Leukocytes, control	H. Leukocytes				pCMVSPORT 1
H0610	H. Leukocytes,	H. Leukocytes				pCMVSPORT

	normalized cot 5A					1
H0611	H. Leukocytes, normalized cot 500 B	H.Leukocytes				pCMVSPORT 1
H0612	H.Leukocytes, normalized cot 50 B	H.Leukocytes				pCMVSPORT 1
H0613	H.Leukocytes, normalized cot 5B	H.Leukocytes				pCMVSPORT 1
H0614	H. Leukocytes, normalized cot 500 A	H.Leukocytes				pCMVSPORT 1
H0615	Human Ovarian Cancer Reexcision	Ovarian Cancer	Ovary		disease	Uni-ZAP XR
H0616	Human Testes, Reexcision	Human Testes	Testis			Uni-ZAP XR
H0617	Human Primary Breast Cancer Reexcision	Human Primary Breast Cancer	Breast		disease	Uni-ZAP XR
H0618	Human Adult Testes, Large Inserts, Reexcision	Human Adult Testis	Testis			Uni-ZAP XR
H0619	Fetal Heart	Human Fetal Heart	Heart			Uni-ZAP XR
H0620	Human Fetal Kidney; Reexcision	Human Fetal Kidney	Kidney			Uni-ZAP XR
H0622	Human Pancreas Tumor; Reexcision	Human Pancreas Tumor	Pancreas		disease	Uni-ZAP XR
H0623	Human Umbilical Vein; Reexcision	Human Umbilical Vein Endothelial Cells	Umbilical vein			Uni-ZAP XR
H0624	12 Week Early Stage Human II; Reexcision	Twelve Week Old Early Stage Human	Embryo			Uni-ZAP XR
H0625	Ku 812F Basophils Line	Ku 812F Basophils				pSPORT1
H0626	Saos2 Cells; Untreated	Saos2 Cell Line; Untreated				pSPORT1
H0627	Saos2 Cells; Vitamin D3 Treated	Saos2 Cell Line; Vitamin D3 Treated				pSPORT1
H0628	Human Pre-Differentiated Adipocytes	Human Pre- Differentiated Adipocytes				Uni-ZAP XR
H0629	Human Leukocyte, control #2	Human Normalized leukocyte				pCMVSPORT 1
H0631	Saos2, Dexamethosone Treated	Saos2 Cell Line; Dexamethosone Treated				pSPORT1
H0632	Hepatocellular Tumor; re- excision	Hepatocellular Tumor	Liver			Lambda ZAP II
H0633	Lung Carcinoma A549 TNFalpha activated	TNFalpha activated A549--Lung Carcinoma			disease	pSPORT1
H0634	Human Testes Tumor, re- excision	Human Testes Tumor	Testis		disease	Uni-ZAP XR
H0635	Human Activated T-Cells, re-excision	Activated T-Cells	Blood	Cell Line		Uni-ZAP XR
H0637	Dendritic Cells From CD34 Cells	Dendritic cells from CD34 cells				pSPORT1
H0638	CD40 activated monocyte dendritic cells	CD40 activated monocyte dendritic cells				pSPORT1
H0639	Ficoll Human Stromal Cells, 5Fu treated	Ficoll Human Stromal Cells, 5Fu treated				Other
H0640	Ficoll Human Stromal Cells, Untreated	Ficoll Human Stromal Cells, Untreated				Other
H0641	LPS activated derived dendritic cells	LPS activated monocyte derived dendritic cells				pSPORT1
H0642	Hep G2 Cells, lambda	Hep G2 Cells				Other

	library					
H0643	Hep G2 Cells, PCR library	Hep G2 Cells				Other
H0644	Human Placenta (re-excision)	Human Placenta	Placenta			Uni-ZAP XR
H0645	Fetal Heart, re-excision	Human Fetal Heart	Heart			Uni-ZAP XR
H0646	Lung, Cancer (4005313 A3): Invasive Poorly Differentiated Lung Adenocarcinoma,	Metastatic squamous cell lung carcinoma, poorly di				pSport1
H0647	Lung, Cancer (4005163 B7): Invasive, Poorly Diff. Adenocarcinoma, Metastatic	Invasive poorly differentiated lung adenocarcinoma			disease	pSport1
H0648	Ovary, Cancer: (4004562 B6) Papillary Serous Cystic Neoplasm, Low Malignant Pot	Papillary Cstic neoplasm of low malignant potentia			disease	pSport1
H0649	Lung, Normal: (4005313 B1)	Normal Lung				pSport1
H0650	B-Cells	B-Cells				pCMVSPORT 3.0
H0651	Ovary, Normal: (9805C040R)	Normal Ovary				pSport1
H0652	Lung, Normal: (4005313 B1)	Normal Lung				pSport1
H0653	Stromal Cells	Stromal Cells				pSport1
H0654	Lung, Cancer: (4005313 A3) Invasive Poorly-differentiated Metastatic lung adenoc	Metastatic Squamous cell lung Carcinoma poorly dif				Other
H0656	B-cells (unstimulated)	B-cells (unstimulated)				pSport1
H0657	B-cells (stimulated)	B-cells (stimulated)				pSport1
H0658	Ovary, Cancer (9809C332): Poorly differentiated adenocarcinoma	9809C332- Poorly differentiate	Ovary & Fallopian Tubes		disease	pSport1
H0659	Ovary, Cancer (15395A1F): Grade II Papillary Carcinoma	Grade II Papillary Carcinoma, Ovary	Ovary		disease	pSport1
H0660	Ovary, Cancer: (15799A1F) Poorly differentiated carcinoma	Poorly differentiated carcinoma, ovary			disease	pSport1
H0661	Breast, Cancer: (4004943 A5)	Breast cancer			disease	pSport1
H0662	Breast, Normal: (4005522B2)	Normal Breast - #4005522(B2)	Breast			pSport1
H0663	Breast, Cancer: (4005522 A2)	Breast Cancer - #4005522(A2)	Breast		disease	pSport1
H0664	Breast, Cancer: (9806C012R)	Breast Cancer	Breast		disease	pSport1
H0665	Stromal cells 3.88	Stromal cells 3.88				pSport1
H0666	Ovary, Cancer: (4004332 A2)	Ovarian Cancer, Sample #4004332A2			disease	pSport1
H0667	Stromal cells(HBM3.18)	Stromal cell(HBM 3.18)				pSport1
H0668	stromal cell clone 2.5	stromal cell clone 2.5				pSport1
H0669	Breast, Cancer: (4005385 A2)	Breast Cancer (4005385A2)	Breast			pSport1
H0670	Ovary, Cancer(4004650 A3): Well-Differentiated	Ovarian Cancer - 4004650A3				pSport1

	Micropapillary Serous Carcinoma					
H0671	Breast, Cancer: (9802C02OE)	Breast Cancer-Sample # 9802C02OE				pSport1
H0672	Ovary, Cancer: (4004576A8)	Ovarian Cancer(4004576A8)	Ovary			pSport1
H0673	Human Prostate Cancer, Stage B2; re-excision	Human Prostate Cancer, stage B2	Prostate			Uni-ZAP XR
H0674	Human Prostate Cancer, Stage C; re-excision	Human Prostate Cancer, stage C	Prostate			Uni-ZAP XR
H0675	Colon, Cancer: (9808C064R)	Colon Cancer 9808C064R				pCMVSPORT 3.0
H0676	Colon, Cancer: (9808C064R)-total RNA	Colon Cancer 9808C064R				pCMVSPORT 3.0
H0677	TNFR degenerate oligo	B-Cells				PCR II
H0682	Serous Papillary Adenocarcinoma	serous papillary adenocarcinoma (9606G304SPA3B)				pCMVSPORT 3.0
H0683	Ovarian Serous Papillary Adenocarcinoma	Serous papillary adenocarcinoma, stage 3C (9804G01)				pCMVSPORT 3.0
H0684	Serous Papillary Adenocarcinoma	Ovarian Cancer-9810G606	Ovaries			pCMVSPORT 3.0
H0685	Adenocarcinoma of Ovary, Human Cell Line, # OVCAR-3	Adenocarcinoma of Ovary, Human Cell Line, # OVCAR-				pCMVSPORT 3.0
H0686	Adenocarcinoma of Ovary, Human Cell Line	Adenocarcinoma of Ovary, Human Cell Line, # SW-626				pCMVSPORT 3.0
H0687	Human normal ovary(#9610G215)	Human normal ovary(#9610G215)	Ovary			pCMVSPORT 3.0
H0688	Human Ovarian Cancer(#9807G017)	Human Ovarian cancer(#9807G017), mRNA from Maura Ru				pCMVSPORT 3.0
H0689	Ovarian Cancer	Ovarian Cancer, #9806G019				pCMVSPORT 3.0
H0690	Ovarian Cancer, #9702G001	Ovarian Cancer, #9702G001				pCMVSPORT 3.0
H0691	Normal Ovary, #9710G208	normal ovary, #9710G208				pCMVSPORT 3.0
H0692	BLyS Receptor from Expression Cloning	B Cell Lymphoma	B Cell			pCMVSPORT 3.0
H0693	Normal Prostate #ODQ3958EN	Normal Prostate Tissue # ODQ3958EN				pCMVSPORT 3.0
H0694	Prostate gland adenocarcinoma	Prostate gland, adenocarcinoma, mod/diff, gleason	prostate gland			pCMVSPORT 3.0
H0695	mononucleocytes from patient	mononucleocytes from patient at Shady Grove Hospit				pCMVSPORT 3.0
N0006	Human Fetal Brain	Human Fetal Brain				
N0007	Human Hippocampus	Human Hippocampus				
N0009	Human Hippocampus, prescreened	Human Hippocampus				
S0001	Brain frontal cortex	Brain frontal cortex	Brain			Lambda ZAP II
S0002	Monocyte activated	Monocyte-activated	blood	Cell Line		Uni-ZAP XR
S0003	Human Osteoclastoma	Osteoclastoma	bone		disease	Uni-ZAP XR
S0004	Prostate	Prostate BPH	Prostate			Lambda

						ZAP II
S0006	Neuroblastoma	Human Neural Blastoma			disease	pCDNA
S0007	Early Stage Human Brain	Human Fetal Brain				Uni-ZAP XR
S0010	Human Amygdala	Amygdala				Uni-ZAP XR
S0011	STROMAL - OSTEOCLASTOMA	Osteoclastoma	bone		disease	Uni-ZAP XR
S0013	Prostate	Prostate	prostate			Uni-ZAP XR
S0015	Kidney medulla	Kidney medulla	Kidney			Uni-ZAP XR
S0016	Kidney Pyramids	Kidney pyramids	Kidney			Uni-ZAP XR
S0022	Human Osteoclastoma Stromal Cells - unamplified	Osteoclastoma Stromal Cells				Uni-ZAP XR
S0023	Human Kidney Cortex - unamplified	Human Kidney Cortex				
S0026	Stromal cell TF274	stromal cell	Bone marrow	Cell Line		Uni-ZAP XR
S0027	Smooth muscle, serum treated	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0028	Smooth muscle, control	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0031	Spinal cord	Spinal cord	spinal cord			Uni-ZAP XR
S0032	Smooth muscle-ILb induced	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0036	Human Substantia Nigra	Human Substantia Nigra				Uni-ZAP XR
S0037	Smooth muscle, IL1b induced	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0038	Human Whole Brain #2 - Oligo dT > 1.5Kb	Human Whole Brain #2				ZAP Express
S0040	Adipocytes	Human Adipocytes from Osteoclastoma				Uni-ZAP XR
S0044	Prostate BPH	prostate BPH	Prostate		disease	Uni-ZAP XR
S0045	Endothelial cells-control	Endothelial cell	endothelial cell-lung	Cell Line		Uni-ZAP XR
S0046	Endothelial-induced	Endothelial cell	endothelial cell-lung	Cell Line		Uni-ZAP XR
S0048	Human Hypothalamus, Alzheimer's	Human Hypothalamus, Alzheimer's			disease	Uni-ZAP XR
S0049	Human Brain, Striatum	Human Brain, Striatum				Uni-ZAP XR
S0050	Human Frontal Cortex, Schizophrenia	Human Frontal Cortex, Schizophrenia			disease	Uni-ZAP XR
S0051	Human Hypothalamus, Schizophrenia	Human Hypothalamus, Schizophrenia			disease	Uni-ZAP XR
S0052	neutrophils control	human neutrophils	blood	Cell Line		Uni-ZAP XR
S0053	Neutrophils IL-1 and LPS induced	human neutrophil induced	blood	Cell Line		Uni-ZAP XR
S0106	STRIATUM DEPRESSION		BRAIN		disease	Uni-ZAP XR
S0110	Brain Amygdala Depression		Brain		disease	Uni-ZAP XR
S0112	Hypothalamus		Brain			Uni-ZAP XR
S0114	Anergic T-cell	Anergic T-cell		Cell Line		Uni-ZAP XR
S0116	Bone marrow	Bone marrow	Bone marrow			Uni-ZAP XR
S0118	Smooth muscle control 2	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0126	Osteoblasts	Osteoblasts	Knee	Cell Line		Uni-ZAP XR
S0132	Epithelial-TNF α and INF induced	Airway Epithelial				Uni-ZAP XR

S0134	Apoptotic T-cell	apoptotic cells		Cell Line		Uni-ZAP XR
S0136	PERM TF274	stromal cell	Bone marrow	Cell Line		Lambda ZAP II
S0140	eosinophil-IL5 induced	eosinophil	lung	Cell Line		Uni-ZAP XR
S0142	Macrophage-oxLDL	macrophage- oxidized LDL treated	blood	Cell Line		Uni-ZAP XR
S0144	Macrophage (GM-CSF treated)	Macrophage (GM- CSF treated)				Uni-ZAP XR
S0146	prostate-edited	prostate BPH	Prostate			Uni-ZAP XR
S0148	Normal Prostate	Prostate	prostate			Uni-ZAP XR
S0150	LNCAP prostate cell line	LNCAP Cell Line	Prostate	Cell Line		Uni-ZAP XR
S0152	PC3 Prostate cell line	PC3 prostate cell line				Uni-ZAP XR
S0168	Prostate/LNCAP, subtraction I	PC3 prostate cell line				pBluescript
S0176	Prostate, normal, subtraction I	Prostate	prostate			Uni-ZAP XR
S0180	Bone Marrow Stroma, TNF&LPS ind	Bone Marrow Stroma, TNF & LPS induced			disease	Uni-ZAP XR
S0182	Human B Cell 8866	Human B- Cell 8866				Uni-ZAP XR
S0188	Prostate,BPH, Lib 2	Human Prostate BPH			disease	pSport1
S0190	Prostate BPH,Lib 2, subtracted	Human Prostate BPH				pSport1
S0192	Synovial Fibroblasts (control)	Synovial Fibroblasts				pSport1
S0194	Synovial hypoxia	Synovial Fibroblasts				pSport1
S0196	Synovial IL-1/TNF stimulated	Synovial Fibroblasts				pSport1
S0206	Smooth Muscle- HASTE normalized	Smooth muscle	Pulmonary artery	Cell Line		pBluescript
S0208	Mesangial cell, frac 1	Mesangial cell				pSport1
S0210	Mesangial cell, frac 2	Mesangial cell				pSport1
S0212	Bone Marrow Stromal Cell, untreated	Bone Marrow Stromal Cell, untreated				pSport1
S0214	Human Osteoclastoma, re- excision	Osteoclastoma	bone		disease	Uni-ZAP XR
S0216	Neutrophils IL-1 and LPS induced	human neutrophil induced	blood	Cell Line		Uni-ZAP XR
S0218	Apoptotic T-cell, re- excision	apoptotic cells		Cell Line		Uni-ZAP XR
S0220	H. hypothalamus, frac A;re-excision	Hypothalamus	Brain			ZAP Express
S0222	H. Frontal cortex,epileptic;re- excision	H. Brain, Frontal Cortex, Epileptic	Brain		disease	Uni-ZAP XR
S0228	PSMIX	PBLS, 7TM receptor enriched				PCRII
S0238	PYFD	PYFD				PCRII
S0242	Synovial Fibroblasts (II1/TNF), subt	Synovial Fibroblasts				pSport1
S0250	Human Osteoblasts II	Human Osteoblasts	Femur		disease	pCMVSPORT 2.0
S0252	7TM-PIMIX	PBLS, 7TM receptor enriched				PCRII
S0256	7TM-PHMIX	PBLS, 7TM receptor enriched				PCRII
S0258	7TM-PNMIX	PBLS, 7TM receptor enriched				PCRII

S0260	Spinal Cord, re-excision	Spinal cord	spinal cord			Uni-ZAP XR
S0266	PLMIX	PLMIX (Human Lung)	Lung			PCRII
S0268	PRMIX	PRMIX (Human Prostate)	prostate			PCRII
S0270	PTMIX	PTMIX (Human Thymus)	Thymus			PCRII
S0276	Synovial hypoxia-RSF subtracted	Synovial fobroblasts (rheumatoid)	Synovial tissue			pSport1
S0278	H Macrophage (GM-CSF treated), re-excision	Macrophage (GM-CSF treated)				Uni-ZAP XR
S0280	Human Adipose Tissue, re-excision	Human Adipose Tissue				Uni-ZAP XR
S0282	Brain Frontal Cortex, re-excision	Brain frontal cortex	Brain			Lambda ZAP II
S0294	Larynx tumor	Larynx tumor	Larynx,vocal cord		disease	pSport1
S0300	Frontal lobe,dementia;re-excision	Frontal Lobe dementia/Alzheimer's	Brain			Uni-ZAP XR
S0306	Larynx normal #10 261-273	Larynx normal				pSport1
S0308	Spleen/normal	Spleen normal				pSport1
S0310	Normal trachea	Normal trachea				pSport1
S0312	Human osteoarthritic;fraction II	Human osteoarthritic cartilage			disease	pSport1
S0314	Human osteoarthritis;fraction I	Human osteoarthritic cartilage			disease	pSport1
S0316	Human Normal Cartilage,Fraction I	Human Normal Cartilage				pSport1
S0318	Human Normal Cartilage Fraction II	Human Normal Cartilage				pSport1
S0324	Human Brain	Brain	Cerebellum			pSport1
S0328	Palate carcinoma	Palate carcinoma	Uvula		disease	pSport1
S0330	Palate normal	Palate normal	Uvula			pSport1
S0332	Pharynx carcinoma	Pharynx carcinoma	Hypopharynx			pSport1
S0334	Human Normal Cartilage Fraction III	Human Normal Cartilage				pSport1
S0336	Human Normal Cartilage Fraction IV	Human Normal Cartilage				pSport1
S0338	Human Osteoarthritic Cartilage Fraction III	Human osteoarthritic cartilage			disease	pSport1
S0342	Adipocytes;re-excision	Human Adipocytes from Osteoclastoma				Uni-ZAP XR
S0344	Macrophage-oxLDL; re-excision	macrophage-oxidized LDL treated	blood	Cell Line		Uni-ZAP XR
S0346	Human Amygdala;re-excision	Amygdala				Uni-ZAP XR
S0348	Cheek Carcinoma	Cheek Carcinoma			disease	pSport1
S0350	Pharynx Carcinoma	Pharynx carcinoma	Hypopharynx		disease	pSport1
S0354	Colon Normal II	Colon Normal	Colon			pSport1
S0356	Colon Carcinoma	Colon Carcinoma	Colon		disease	pSport1
S0358	Colon Normal III	Colon Normal	Colon			pSport1
S0360	Colon Tumor II	Colon Tumor	Colon		disease	pSport1
S0362	Human Gastrocnemius	Gastrocnemius muscle				pSport1
S0364	Human Quadriceps	Quadriceps muscle				pSport1
S0366	Human Soleus	Soleus Muscle				pSport1

S0370	Larynx carcinoma II	Larynx carcinoma			disease	pSport1
S0372	Larynx carcinoma III	Larynx carcinoma			disease	pSport1
S0374	Normal colon	Normal colon				pSport1
S0376	Colon Tumor	Colon Tumor			disease	pSport1
S0378	Pancreas normal PCA4 No	Pancreas Normal PCA4 No				pSport1
S0380	Pancreas Tumor PCA4 Tu	Pancreas Tumor PCA4 Tu			disease	pSport1
S0382	Larynx carcinoma IV	Larynx carcinoma			disease	pSport1
S0384	Tongue carcinoma	Tongue carcinoma			disease	pSport1
S0386	Human Whole Brain, re-excision	Whole brain	Brain			ZAP Express
S0388	Human Hypothalamus, schizophrenia, re-excision	Human Hypothalamus, Schizophrenia			disease	Uni-ZAP XR
S0390	Smooth muscle, control; re-excision	Smooth muscle	Pulmonary artery	Cell Line		Uni-ZAP XR
S0392	Salivary Gland	Salivary gland; normal				pSport1
S0396	Uterus; normal	Uterus; normal				pSport1
S0400	Brain; normal	Brain; normal				pSport1
S0402	Adrenal Gland, normal	Adrenal gland; normal				pSport1
S0404	Rectum normal	Rectum, normal				pSport1
S0406	Rectum tumour	Rectum tumour				pSport1
S0408	Colon, normal	Colon, normal				pSport1
S0410	Colon, tumour	Colon, tumour				pSport1
S0412	Temporal cortex- Alzheimer; subtracted	Temporal cortex, alzheimer			disease	Other
S0414	Hippocampus, Alzheimer Subtracted	Hippocampus, Alzheimer Subtracted				Other
S0418	CHME Cell Line; treated 5 hrs	CHME Cell Line; treated				pCMVSPORT 3.0
S0420	CHME Cell Line, untreated	CHME Cell line, untreated				pSport1
S0422	Mo7e Cell Line GM-CSF treated (1ng/ml)	Mo7e Cell Line GM-CSF treated (1ng/ml)				pCMVSPORT 3.0
S0424	TF-1 Cell Line GM-CSF Treated	TF-1 Cell Line GM-CSF Treated				pSport1
S0426	Monocyte activated; re-excision	Monocyte-activated	blood	Cell Line		Uni-ZAP XR
S0428	Neutrophils control; re-excision	human neutrophils	blood	Cell Line		Uni-ZAP XR
S0430	Aryepiglottis Normal	Aryepiglottis Normal				pSport1
S0432	Sinus piniformis Tumour	Sinus piniformis Tumour				pSport1
S0434	Stomach Normal	Stomach Normal			disease	pSport1
S0436	Stomach Tumour	Stomach Tumour			disease	pSport1
S0438	Liver Normal Met5No	Liver Normal Met5No				pSport1
S0440	Liver Tumour Met 5 Tu	Liver Tumour				pSport1
S0442	Colon Normal	Colon Normal				pSport1
S0444	Colon Tumor	Colon Tumour			disease	pSport1
S0446	Tongue Tumour	Tongue Tumour				pSport1
S0448	Larynx Normal	Larynx Normal				pSport1
S0450	Larynx Tumour	Larynx Tumour				pSport1
S0452	Thymus	Thymus				pSport1
S0458	Thyroid Normal (SDCA2 No)	Thyroid normal				pSport1

S0460	Thyroid Tumour	Thyroid Tumour				pSport1
S0462	Thyroid Thyroiditis	Thyroid Thyroiditis				pSport1
S0464	Larynx Normal	Larynx Normal				pSport1
S0466	Larynx Tumor	Larynx Tumor			disease	pSport1
S0468	Ea.hy.926 cell line	Ea.hy.926 cell line				pSport1
S0472	Lung Mesothelium	PYBT				pSport1
S0474	Human blood platelets	Platelets	Blood platelets			Other
S0665	Human Amygdala; re-excision	Amygdala				Uni-ZAP XR
S3012	Smooth Muscle Serum Treated, Norm	Smooth muscle	Pulmonary artery	Cell Line		pBluescript
S3014	Smooth muscle, serum induced, re-exc	Smooth muscle	Pulmonary artery	Cell Line		pBluescript
S3018	TH1 cells	TH1 cells				Uni-ZAP XR
S3020	TH2 cells	TH2 cells				Uni-ZAP XR
S6014	H. hypothalamus, frac A	Hypothalamus	Brain			ZAP Express
S6016	H. Frontal Cortex, Epileptic	H. Brain, Frontal Cortex, Epileptic	Brain		disease	Uni-ZAP XR
S6022	H. Adipose Tissue	Human Adipose Tissue				Uni-ZAP XR
S6024	Alzheimers, spongy change	Alzheimer's/Spongy change	Brain		disease	Uni-ZAP XR
S6026	Frontal Lobe, Dementia	Frontal Lobe dementia/Alzheimer's	Brain			Uni-ZAP XR
S6028	Human Manic Depression Tissue	Human Manic depression tissue	Brain		disease	Uni-ZAP XR
T0001	Human Brown Fat	Brown Fat				pBluescript SK-
T0002	Activated T-cells	Activated T-Cell, PBL fraction	Blood	Cell Line		pBluescript SK-
T0003	Human Fetal Lung	Human Fetal Lung				pBluescript SK-
T0004	Human White Fat	Human White Fat				pBluescript SK-
T0006	Human Pineal Gland	Human Pineal Gland				pBluescript SK-
T0008	Colorectal Tumor	Colorectal Tumor			disease	pBluescript SK-
T0010	Human Infant Brain	Human Infant Brain				Other
T0023	Human Pancreatic Carcinoma	Human Pancreatic Carcinoma			disease	pBluescript SK-
T0039	HSA 172 Cells	Human HSA172 cell line				pBluescript SK-
T0040	HSC172 cells	SA172 Cells				pBluescript SK-
T0041	Jurkat T-cell G1 phase	Jurkat T-cell				pBluescript SK-
T0042	Jurkat T-Cell, S phase	Jurkat T-Cell Line				pBluescript SK-
T0047	T lymphocytes >70	T lymphocytes > 70				pBluescript SK-
T0048	Human Aortic Endothelium	Human Aortic Endothelium				pBluescript SK-
T0049	Aorta endothelial cells + TNF-a	Aorta endothelial cells				pBluescript SK-
T0060	Human White Adipose	Human White Fat				pBluescript SK-
T0067	Human Thyroid	Human Thyroid				pBluescript SK-
T0068	Normal Ovary,	Normal Ovary,				pBluescript

	Premenopausal	Premenopausal				SK-
T0069	Human Uterus, normal	Human Uterus, normal				pBluescript SK-
T0071	Human Bone Marrow	Human Bone Marrow				pBluescript SK-
T0074	Human Adult Retina	Human Adult Retina				pBluescript SK-
T0082	Human Adult Retina	Human Adult Retina				pBluescript SK-
T0086	Human Pancreatic Carcinoma -- Screened	Human Pancreatic Carcinoma			disease	pBluescript SK-
T0109	Human (HCC) cell line liver (mouse) metastasis, remake					pBluescript SK-
T0110	Human colon carcinoma (HCC) cell line, remake					pBluescript SK-
T0112	Human (Caco-2) cell line, adenocarcinoma, colon					pBluescript SK-
T0114	Human (Caco-2) cell line, adenocarcinoma, colon, remake					pBluescript SK-
T0115	Human Colon Carcinoma (HCC) cell line					pBluescript SK-
L0002	Atrium cDNA library Human heart					
L0005	Clontech human aorta polyA+ mRNA (#6572)					
L0015	Human					
L0021	Human adult (K.Okubo)					
L0022	Human adult lung 3" directed MboI cDNA					
L0033	Human chromosome 13q14 cDNA					
L0040	Human colon mucosa					
L0041	Human epidermal keratinocyte					
L0052	Human normalized K562-cDNA					
L0055	Human promyelocyte					
L0062	Human whole brain					
L0065	Liver HepG2 cell line.					
L0097	Subtracted human retinal pigment epithelium (RPE)					
L0105	Human aorta polyA+ (TFujiwara)	aorta				
L0109	Human brain cDNA	brain				
L0142	Human placenta cDNA (TFujiwara)	placenta				
L0143	Human placenta polyA+ (TFujiwara)	placenta				
L0149	DKFZphsnu1	subthalamic nucleus				
L0151	Human testis (C. De Smet)	testis				
L0157	Human fetal brain (TFujiwara)		brain			
L0163	Human heart cDNA (YNakamura)		heart			
L0179	Human lung adenocarcinoma (M. Wu)	lung adenocarcinoma		GLC-82		
L0194	Human pancreatic cancer cell line Patu 8988t	pancreatic cancer		Patu 8988t		
L0351	Infant brain, Bento Soares					BA, M13-

						derived
L0352	Normalized infant brain, Bento Soares					BA, M13- derived
L0355	P, Human foetal Brain Whole tissue					Bluescript
L0356	S, Human foetal Adrenals tissue					Bluescript
L0359	X, Human Liver tissue					Bluescript KS II+
L0360	Y, Human Placenta tissue					Bluescript KS II+
L0361	Stratagene ovary (#937217)		ovary			Bluescript SK
L0362	Stratagene ovarian cancer (#937219)					Bluescript SK-
L0363	NCI_CGAP_GC2	germ cell tumor				Bluescript SK-
L0364	NCI_CGAP_GC5	germ cell tumor				Bluescript SK-
L0366	Stratagene schizo brain S11	schizophrenic brain S-11 frontal lobe				Bluescript SK-
L0367	NCI_CGAP_Sch1	Schwannoma tumor				Bluescript SK-
L0368	NCI_CGAP_SS1	synovial sarcoma				Bluescript SK-
L0369	NCI_CGAP_AA1	adrenal adenoma	adrenal gland			Bluescript SK-
L0370	Johnston frontal cortex	pooled frontal lobe	brain			Bluescript SK-
L0371	NCI_CGAP_Br3	breast tumor	breast			Bluescript SK-
L0372	NCI_CGAP_Co12	colon tumor	colon			Bluescript SK-
L0373	NCI_CGAP_Co11	tumor	colon			Bluescript SK-
L0374	NCI_CGAP_Co2	tumor	colon			Bluescript SK-
L0375	NCI_CGAP_Kid6	kidney tumor	kidney			Bluescript SK-
L0376	NCI_CGAP_Lar1	larynx	larynx			Bluescript SK-
L0377	NCI_CGAP_HN2	squamous cell carcinoma from vocal cord	larynx			Bluescript SK-
L0378	NCI_CGAP_Lu1	lung tumor	lung			Bluescript SK-
L0379	NCI_CGAP_Lym3	lymphoma	lymph node			Bluescript SK-
L0381	NCI_CGAP_HN4	squamous cell carcinoma	pharynx			Bluescript SK-
L0382	NCI_CGAP_Pr25	epithelium (cell line)	prostate			Bluescript SK-
L0383	NCI_CGAP_Pr24	invasive tumor (cell line)	prostate			Bluescript SK-
L0384	NCI_CGAP_Pr23	prostate tumor	prostate			Bluescript SK-
L0386	NCI_CGAP_HN3	squamous cell carcinoma from base of tongue	tongue			Bluescript SK-
L0387	NCI_CGAP_GCB0	germinal center B- cells	tonsil			Bluescript SK-
L0388	NCI_CGAP_HN6	normal gingiva (cell line from				Bluescript SK-

L0389	NCI_CGAP_HN5	immortalized kerati normal gingiva (cell line from primary keratinocyt				Bluescript SK-
L0393	B, Human Liver tissue					gt11
L0406	b4HB3MA Cot14.5					Lafmid A
L0411	1-NIB					Lafmid BA
L0416	b4HB3MA-Cot0.38-HAP- B					Lafmid BA
L0419	b4HB3MA- Cot109+103+85-Bio					Lafmid BA
L0420	b4HB3MA-Cot109+103- Bio					Lafmid BA
L0425	b4HB3MA-Cot18-Bio					Lafmid BA
L0427	b4HB3MA-FT20%-Biotin					Lafmid BA
L0435	Infant brain, LLNL array of Dr. M. Soares 1NIB					lafmid BA
L0438	normalized infant brain cDNA	total brain	brain			lafmid BA
L0439	Soares infant brain 1NIB		whole brain			Lafmid BA
L0441	2HB3MK					Lafmid BK
L0444	HB3MK					Lafmid BK
L0448	3HFLSK20					Lafmid K
L0454	Clontech adult human fat cell library HL1108A					lambda gt10
L0455	Human retina cDNA randomly primed sublibrary	retina	eye			lambda gt10
L0456	Human retina cDNA Tsp509I-cleaved sublibrary	retina	eye			lambda gt10
L0462	WATM1					lambda gt11
L0468	HE6W					lambda zap
L0471	Human fetal heart, Lambda ZAP Express					Lambda ZAP Express
L0475	KG1-a Lambda Zap Express cDNA library			KG1-a		Lambda Zap Express (Stratagene)
L0477	HPLA CCLee	placenta				Lambda ZAP II
L0480	Stratagene cat#937212 (1992)					Lambda ZAP, pBluescript SK(-)
L0481	CD34+DIRECTIONAL					Lambda ZAPII
L0483	Human pancreatic islet					Lambda ZAPII
L0485	STRATAGENE Human skeletal muscle cDNA library, cat. #936215.	skeletal muscle	leg muscle			Lambda ZAPII
L0493	NCI_CGAP_Ov26	papillary serous carcinoma	ovary			pAMP1
L0497	NCI_CGAP_HSC4	CD34+, CD38- from normal bone marrow donor	bone marrow			pAMP1
L0498	NCI_CGAP_HSC3	CD34+, T negative, patient with chronic myelogenou	bone marrow			pAMP1
L0499	NCI_CGAP_HSC2	stem cell 34+/38+	bone marrow			pAMP1
L0500	NCI CGAP Brn20	oligodendroglioma	brain			pAMP1
L0501	NCI CGAP Brn21	oligodendroglioma	brain			pAMP1

L0509	NCI_CGAP_Lu26	invasive adenocarcinoma	lung			pAMP1
L0510	NCI_CGAP_Ov33	borderline ovarian carcinoma	ovary			pAMP1
L0512	NCI_CGAP_Ov36	borderline ovarian carcinoma	ovary			pAMP1
L0513	NCI_CGAP_Ov37	early stage papillary serous carcinoma	ovary			pAMP1
L0515	NCI_CGAP_Ov32	papillary serous carcinoma	ovary			pAMP1
L0517	NCI_CGAP_Pr1					pAMP10
L0518	NCI_CGAP_Pr2					pAMP10
L0519	NCI_CGAP_Pr3					pAMP10
L0520	NCI_CGAP_Alv1	alveolar rhabdomyosarcoma				pAMP10
L0521	NCI_CGAP_Ew1	Ewing's sarcoma				pAMP10
L0522	NCI_CGAP_Kid1	kidney				pAMP10
L0523	NCI_CGAP_Lip2	liposarcoma				pAMP10
L0525	NCI_CGAP_Li2	liver				pAMP10
L0526	NCI_CGAP_Pr12	metastatic prostate bone lesion				pAMP10
L0527	NCI_CGAP_Ov2	ovary				pAMP10
L0528	NCI_CGAP_Pr5	prostate				pAMP10
L0529	NCI_CGAP_Pr6	prostate				pAMP10
L0530	NCI_CGAP_Pr8	prostate				pAMP10
L0532	NCI_CGAP_Thy1	thyroid				pAMP10
L0533	NCI_CGAP_HSC1	stem cells	bone marrow			pAMP10
L0534	Chromosome 7 Fetal Brain cDNA Library	brain	brain			pAMP10
L0535	NCI_CGAP_Pr5	infiltrating ductal carcinoma	breast			pAMP10
L0538	NCI_CGAP_Ov5	normal surface epithelium	ovary			pAMP10
L0539	Chromosome 7 Placental cDNA Library		placenta			pAMP10
L0541	NCI_CGAP_Pr7	low-grade prostatic neoplasia	prostate			pAMP10
L0542	NCI_CGAP_Pr11	normal prostatic epithelial cells	prostate			pAMP10
L0543	NCI_CGAP_Pr9	normal prostatic epithelial cells	prostate			pAMP10
L0544	NCI_CGAP_Pr4	prostatic intraepithelial neoplasia - high grade	prostate			pAMP10
L0545	NCI_CGAP_Pr4.1	prostatic intraepithelial neoplasia - high grade	prostate			pAMP10
L0551	NCI_CGAP_HN7	normal squamous epithelium, floor of mouth				pAMP10
L0558	NCI_CGAP_Ov40	endometrioid ovarian metastasis	ovary			pAMP10
L0559	NCI_CGAP_Ov39	papillary serous ovarian metastasis	ovary			pAMP10
L0560	NCI_CGAP_HN12	moderate to poorly differentiated invasive carcino	tongue			pAMP10
L0561	NCI_CGAP_HN11	normal squamous epithelium	tongue			pAMP10
L0562	Chromosome 7 HeLa			HeLa cell		pAMP10

	cDNA Library			line; ATCC		
L0563	Human Bone Marrow Stromal Fibroblast	bone marrow				pBluescript
L0564	Jia bone marrow stroma	bone marrow stroma				pBluescript
L0565	Normal Human Trabecular Bone Cells	Bone	Hip			pBluescript
L0581	Stratagene liver (#937224)		liver			pBluescript SK
L0584	Stratagene cDNA library Human heart, cat#936208					pBluescript SK(+)
L0586	HTCDL1					pBluescript SK(-)
L0587	Stratagene colon HT29 (#937221)					pBluescript SK-
L0588	Stratagene endothelial cell 937223					pBluescript SK-
L0589	Stratagene fetal retina 937202					pBluescript SK-
L0590	Stratagene fibroblast (#937212)					pBluescript SK-
L0591	Stratagene HeLa cell s3 937216					pBluescript SK-
L0592	Stratagene hNT neuron (#937233)					pBluescript SK-
L0593	Stratagene neuroepithelium (#937231)					pBluescript SK-
L0594	Stratagene neuroepithelium NT2RAMI 937234					pBluescript SK-
L0595	Stratagene NT2 neuronal precursor 937230	neuroepithelial cells	brain			pBluescript SK-
L0596	Stratagene colon (#937204)		colon			pBluescript SK-
L0597	Stratagene corneal stroma (#937222)		cornea			pBluescript SK-
L0598	Morton Fetal Cochlea	cochlea	ear			pBluescript SK-
L0599	Stratagene lung (#937210)		lung			pBluescript SK-
L0600	Weizmann Olfactory Epithelium	olfactory epithelium	nose			pBluescript SK-
L0601	Stratagene pancreas (#937208)		pancreas			pBluescript SK-
L0602	Pancreatic Islet	pancreatic islet	pancreas			pBluescript SK-
L0603	Stratagene placenta (#937225)		placenta			pBluescript SK-
L0604	Stratagene muscle 937209	muscle	skeletal muscle			pBluescript SK-
L0605	Stratagene fetal spleen (#937205)	fetal spleen	spleen			pBluescript SK-
L0606	NCI_CGAP_Lym5	follicular lymphoma	lymph node			pBluescript SK-
L0607	NCI_CGAP_Lym6	mantle cell lymphoma	lymph node			pBluescript SK-
L0608	Stratagene lung carcinoma 937218	lung carcinoma	lung	NCI-H69		pBluescript SK-
L0609	Schiller astrocytoma	astrocytoma	brain			pBluescript SK- (Stratagene)
L0611	Schiller meningioma	meningioma	brain			pBluescript

						SK- (Stratagene)
L0612	Schiller oligodendroglioma	oligodendroglioma	brain			pBluescript SK- (Stratagene)
L0615	22 week old human fetal liver cDNA library					pBluescriptII SK(-)
L0617	Chromosome 22 exon					pBluescriptII KS+
L0618	Chromosome 9 exon					pBluescriptII KS+
L0622	HM1					pcDNAII (Invitrogen)
L0623	HM3	pectoral muscle (after mastectomy)				pcDNAII (Invitrogen)
L0625	NCI_CGAP_AR1	bulk alveolar tumor				pCMV- SPORT2
L0626	NCI_CGAP_GC1	bulk germ cell seminoma				pCMV- SPORT2
L0627	NCI_CGAP_Co1	bulk tumor	colon			pCMV- SPORT2
L0628	NCI_CGAP_Ov1	ovary bulk tumor	ovary			pCMV- SPORT2
L0629	NCI_CGAP_Mel3	metastatic melanoma to bowel	bowel (skin primary)			pCMV- SPORT4
L0630	NCI_CGAP_CNS1	substantia nigra	brain			pCMV- SPORT4
L0631	NCI_CGAP_Br7		breast			pCMV- SPORT4
L0633	NCI_CGAP_Lu6	small cell carcinoma	lung			pCMV- SPORT4
L0634	NCI_CGAP_Ov8	serous adenocarcinoma	ovary			pCMV- SPORT4
L0635	NCI_CGAP_PNS1	dorsal root ganglion	peripheral nervous system			pCMV- SPORT4
L0636	NCI_CGAP_Pit1	four pooled pituitary adenomas	brain			pCMV- SPORT6
L0637	NCI_CGAP_Brn53	three pooled meningiomas	brain			pCMV- SPORT6
L0638	NCI_CGAP_Brn35	tumor, 5 pooled (see description)	brain			pCMV- SPORT6
L0639	NCI_CGAP_Brn52	tumor, 5 pooled (see description)	brain			pCMV- SPORT6
L0640	NCI_CGAP_Br18	four pooled high- grade tumors, including two prima	breast			pCMV- SPORT6
L0641	NCI_CGAP_Co17	juvenile granulosa tumor	colon			pCMV- SPORT6
L0642	NCI_CGAP_Co18	moderately differentiated adenocarcinoma	colon			pCMV- SPORT6
L0643	NCI_CGAP_Co19	moderately differentiated adenocarcinoma	colon			pCMV- SPORT6
L0644	NCI_CGAP_Co20	moderately differentiated adenocarcinoma	colon			pCMV- SPORT6
L0645	NCI_CGAP_Co21	moderately differentiated adenocarcinoma	colon			pCMV- SPORT6
L0646	NCI_CGAP_Co14	moderately- differentiated	colon			pCMV- SPORT6

		adenocarcinoma				
L0647	NCI_CGAP_Sar4	five pooled sarcomas, including myxoid liposarcoma	connective tissue			pCMV-SPORT6
L0648	NCI_CGAP_Eso2	squamous cell carcinoma	esophagus			pCMV-SPORT6
L0649	NCI_CGAP_GU1	2 pooled high-grade transitional cell tumors	genitourinary tract			pCMV-SPORT6
L0650	NCI_CGAP_Kid13	2 pooled Wilms' tumors, one primary and one metast	kidney			pCMV-SPORT6
L0651	NCI_CGAP_Kid8	renal cell tumor	kidney			pCMV-SPORT6
L0652	NCI_CGAP_Lu27	four pooled poorly-differentiated adenocarcinomas	lung			pCMV-SPORT6
L0653	NCI_CGAP_Lu28	two pooled squamous cell carcinomas	lung			pCMV-SPORT6
L0654	NCI_CGAP_Lu31		lung, cell line			pCMV-SPORT6
L0655	NCI_CGAP_Lym12	lymphoma, follicular mixed small and large cell	lymph node			pCMV-SPORT6
L0656	NCI_CGAP_Ov38	normal epithelium	ovary			pCMV-SPORT6
L0657	NCI_CGAP_Ov23	tumor, 5 pooled (see description)	ovary			pCMV-SPORT6
L0658	NCI_CGAP_Ov35	tumor, 5 pooled (see description)	ovary			pCMV-SPORT6
L0659	NCI_CGAP_Pan1	adenocarcinoma	pancreas			pCMV-SPORT6
L0661	NCI_CGAP_Mel15	malignant melanoma, metastatic to lymph node	skin			pCMV-SPORT6
L0662	NCI_CGAP_Gas4	poorly differentiated adenocarcinoma with signet r	stomach			pCMV-SPORT6
L0663	NCI_CGAP_Ut2	moderately-differentiated endometrial adenocarcino	uterus			pCMV-SPORT6
L0664	NCI_CGAP_Ut3	poorly-differentiated endometrial adenocarcinoma,	uterus			pCMV-SPORT6
L0665	NCI_CGAP_Ut4	serous papillary carcinoma, high grade, 2 pooled t	uterus			pCMV-SPORT6
L0666	NCI_CGAP_Ut1	well-differentiated endometrial adenocarcinoma, 7	uterus			pCMV-SPORT6
L0667	NCI_CGAP_CML1	myeloid cells, 18 pooled CML cases, BCR/ABL rearra	whole blood			pCMV-SPORT6
L0681	Stanley Frontal SN individual	frontal lobe (see description)	brain			pCR2.1 (Invitrogen)
L0684	Stanley Frontal SB pool 1	frontal lobe (see description)	brain			pCR2.1-TOPO (Invitrogen)
L0695	Human Glioblastoma Cell		Brain	BT-325		PCR11, Invitrogen

L0697	Testis 1					PGEM 5zf(+)
L0698	Testis 2					PGEM 5zf(+)
L0717	Gessler Wilms tumor					pSPORT1
L0720	PN001-Normal Human Prostate		prostate			pSport1
L0731	Soares_pregnant_uterus_ NbHPU		uterus			pT7T3-Pac
L0738	Human colorectal cancer					pT7T3D
L0740	Soares melanocyte 2NbHM	melanocyte				pT7T3D (Pharmacia) with a modified polylinker
L0741	Soares adult brain N2b4HB55Y		brain			pT7T3D (Pharmacia) with a modified polylinker
L0742	Soares adult brain N2b5HB55Y		brain			pT7T3D (Pharmacia) with a modified polylinker
L0743	Soares breast 2NbHBst		breast			pT7T3D (Pharmacia) with a modified polylinker
L0744	Soares breast 3NbHBst		breast			pT7T3D (Pharmacia) with a modified polylinker
L0745	Soares retina N2b4HR	retina	eye			pT7T3D (Pharmacia) with a modified polylinker
L0746	Soares retina N2b5HR	retina	eye			pT7T3D (Pharmacia) with a modified polylinker
L0747	Soares_fetal_heart_NbHH 19W		heart			pT7T3D (Pharmacia) with a modified polylinker
L0748	Soares fetal liver spleen 1NFLS		Liver and Spleen			pT7T3D (Pharmacia) with a modified polylinker
L0749	Soares_fetal_liver_spleen _1NFLS_S1		Liver and Spleen			pT7T3D (Pharmacia) with a modified polylinker
L0750	Soares_fetal_lung_NbHL1 9W		lung			pT7T3D (Pharmacia) with a modified

						polylinker
L0751	Soares ovary tumor NbHOT	ovarian tumor	ovary			pT7T3D (Pharmacia) with a modified polylinker
L0752	Soares_parathyroid_tumor _NbHPA	parathyroid tumor	parathyroid gland			pT7T3D (Pharmacia) with a modified polylinker
L0753	Soares_pineal_gland_N3H PG		pineal gland			pT7T3D (Pharmacia) with a modified polylinker
L0754	Soares placenta Nb2HP		placenta			pT7T3D (Pharmacia) with a modified polylinker
L0755	Soares_placenta_8to9wee ks_2NbHP8to9W		placenta			pT7T3D (Pharmacia) with a modified polylinker
L0756	Soares_multiple_sclerosis _2NbHMSP	multiple sclerosis lesions				pT7T3D (Pharmacia) with a modified polylinker V_TYPE
L0757	Soares_senescent_fibrobla sts_NbHSF	senescent fibroblast				pT7T3D (Pharmacia) with a modified polylinker V_TYPE
L0758	Soares_testis_NHT					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0759	Soares_total_fetus_Nb2H F8_9w					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0760	Barstead aorta HPLRB3	aorta				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0761	NCI_CGAP_CLL1	B-cell, chronic lymphotic leukemia				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0762	NCI_CGAP_Br1.1	breast				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0763	NCI_CGAP_Br2	breast				pT7T3D-Pac

						(Pharmacia) with a modified polylinker
L0764	NCI_CGAP_Co3	colon				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0765	NCI_CGAP_Co4	colon				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0766	NCI_CGAP_GCB1	germinal center B cell				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0767	NCI_CGAP_GC3	pooled germ cell tumors				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0768	NCI_CGAP_GC4	pooled germ cell tumors				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0769	NCI_CGAP_Brn25	anaplastic oligodendroglioma	brain			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0770	NCI_CGAP_Brn23	glioblastoma (pooled)	brain			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0771	NCI_CGAP_Co8	adenocarcinoma	colon			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0772	NCI_CGAP_Co10	colon tumor RER+	colon			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0773	NCI_CGAP_Co9	colon tumor RER+	colon			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0774	NCI_CGAP_Kid3		kidney			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0775	NCI_CGAP_Kid5	2 pooled tumors (clear cell type)	kidney			pT7T3D-Pac (Pharmacia) with a modified polylinker

L0776	NCI_CGAP_Lu5	carcinoid	lung			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0777	Soares_NhHMPu_S1	Pooled human melanocyte, fetal heart, and pregnant	mixed (see below)			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0778	Barstead pancreas HPLRB1		pancreas			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0779	Soares_NFL_T_GBC_S1		pooled			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0780	Soares_NSF_F8_9W_OT _PA_P_S1		pooled			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0782	NCI_CGAP_Pr21	normal prostate	prostate			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0783	NCI_CGAP_Pr22	normal prostate	prostate			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0784	NCI_CGAP_Lei2	leiomyosarcoma	soft tissue			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0785	Barstead spleen HPLRB2		spleen			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0786	Soares_NbHFB		whole brain			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0787	NCI_CGAP_Sub1					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0788	NCI_CGAP_Sub2					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0789	NCI_CGAP_Sub3					pT7T3D-Pac (Pharmacia) with a modified

						polylinker
L0790	NCI_CGAP_Sub4					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0791	NCI_CGAP_Sub5					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0792	NCI_CGAP_Sub6					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0793	NCI_CGAP_Sub7					pT7T3D-Pac (Pharmacia) with a modified polylinker
L0794	NCI_CGAP_GC6	pooled germ cell tumors				pT7T3D-Pac (Pharmacia) with a modified polylinker
L0796	NCI_CGAP_Brn50	medulloblastoma	brain			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0800	NCI_CGAP_Co16	colon tumor, RER+	colon			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0803	NCI_CGAP_Kid11		kidney			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0804	NCI_CGAP_Kid12	2 pooled tumors (clear cell type)	kidney			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0805	NCI_CGAP_Lu24	carcinoid	lung			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0806	NCI_CGAP_Lu19	squamous cell carcinoma, poorly differentiated (4	lung			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0807	NCI_CGAP_Ov18	fibrotheoma	ovary			pT7T3D-Pac (Pharmacia) with a modified polylinker
L0808	Barstead prostate BPH HPLRB4 1		prostate			pT7T3D-Pac (Pharmacia) with a

						modified polylinker
L0809	NCI_CGAP_Pr28		prostate			pT7T3D-Pac (Pharmacia), with a modified polylinker
L2242	subtracted 3" EST library		pancreas	AsPC- 1(ATCC: CRL- 1682)		pUC18
L2251	Human fetal lung	Fetal lung				

TABLE 5

OMIM Reference	Description
100710	Myasthenic syndrome, slow-channel congenital, 601462
103050	Autism, succinylpurinemic
103050	Adenylosuccinase deficiency
104770	Amyloidosis, secondary, susceptibility to
106165	Hypertension, essential, 145500
107280	Cerebrovascular disease, occlusive
107280	Alpha-1-antichymotrypsin deficiency
107300	Antithrombin III deficiency
107400	Emphysema
107400	Emphysema-cirrhosis
107670	Apolipoprotein A-II deficiency
107777	Diabetes insipidus, nephrogenic, autosomal recessive, 222000
108725	Atherosclerosis, susceptibility to
109690	Asthma, nocturnal, susceptibility to
109690	Obesity, susceptibility to
110700	Vivax malaria, susceptibility to
113721	Breast cancer
113900	Heart block, progressive familial, type I
114208	Malignant hyperthermia susceptibility 5, 601887
114208	Hypokalemic periodic paralysis, 170400
116806	Colorectal cancer
117700	[Hypoceruloplasminemia, hereditary]
117700	Hemosiderosis, systemic, due to aceruloplasminemia
119300	van der Woude syndrome
120120	Epidermolysis bullosa dystrophica, dominant, 131750
120120	Epidermolysis bullosa dystrophica, recessive, 226600
120120	Epidermolysis bullosa, pretibial, 131850
120260	Epiphyseal dysplasia, multiple, type 2, 600204
120436	Muir-Torre family cancer syndrome, 158320
120436	Turcot syndrome with glioblastoma, 276300
120436	Colorectal cancer, hereditary nonpolyposis, type 2
120620	SLE susceptibility
120620	CR1 deficiency
120700	C3 deficiency
120920	Measles, susceptibility to
120950	C8 deficiency, type I
120960	C8 deficiency, type II
122500	[Transcortin deficiency]
123101	Craniosynostosis, type 2
123829	Melanoma
123940	White sponge nevus, 193900

124030	Parkinsonism, susceptibility to
124030	Debrisoquine sensitivity
125264	Leukemia, acute nonlymphocytic
126340	Xeroderma pigmentosum, group D, 278730
126391	DNA ligase I deficiency
129490	Ectodermal dysplasia-3, anhidrotic
130410	Glutaricaciduria, type IIB
130500	Elliptocytosis-1
131210	Atherosclerosis, susceptibility to
133171	[Erythrocytosis, familial], 133100
133200	Erythrokeratoderma variabilis
134370	Factor H deficiency
134370	Hemolytic-uremic syndrome, 235400
134370	Membroproliferative glomerulonephritis
134570	Factor XIIIa deficiency
134580	Factor XIIB deficiency
134790	Hyperferritinemia-cataract syndrome, 600886
135940	Ichthyosis vulgaris, 146700
136132	[Fish-odor syndrome], 602079
136836	Fucosyltransferase-6 deficiency
137600	Iridogoniodysgenesis syndrome
138140	Glucose transport defect, blood-brain barrier
138190	Diabetes mellitus, noninsulin-dependent
138320	Hemolytic anemia due to glutathione peroxidase deficiency
138570	Non-insulin dependent diabetes mellitus, susceptibility to
138981	Pulmonary alveolar proteinosis, 265120
139350	Epidermolytic hyperkeratosis, 113800
139350	Keratoderma, palmoplantar, nonepidermolytic
141750	Alpha-thalassemia/mental retardation syndrome, type 1
141800	Methemoglobinemias, alpha-
141800	Thalassemias, alpha-
141800	Erythremias, alpha-
141800	Heinz body anemias, alpha-
141850	Thalassemia, alpha-
141850	Erythrocytosis
141850	Heinz body anemia
141850	Hemoglobin H disease
141850	Hypochromic microcytic anemia
145001	Hyperparathyroidism-jaw tumor syndrome
145260	Pseudohypoaldosteronism, type II
145981	Hypocalciuric hypercalcemia, type II
146790	Lupus nephritis, susceptibility to
147141	Leukemia, acute lymphoblastic
147570	Interferon, immune, deficiency
147680	Severe combined immunodeficiency due to IL2 deficiency
147730	Interleukin-2 receptor, alpha chain, deficiency of

147781	Atopy, susceptibility to
148040	Epidermolysis bullosa simplex, Koebner, Dowling-Meara, and Weber-Cockayne types, 131900, 131760, 131800
148041	Pachyonychia congenita, Jadassohn-Lewandowsky type, 167200
148043	Meesmann corneal dystrophy, 122100
148070	Liver disease, susceptibility to, from hepatotoxins or viruses
150210	Lactoferrin-deficient neutrophils, 245480
150292	Epidermolysis bullosa, Herlitz junctional type, 226700
150310	Epidermolysis bullosa, Herlitz junctional type, 226700
150310	Epidermolysis bullosa, generalized atrophic benign, 226650
152445	Vohwinkel syndrome, 124500
152445	Erythrokeratoderma, progressive symmetric, 602036
156850	Cataract, congenital, with microphthalmia
157640	PEO with mitochondrial DNA deletions, type 1
159001	Muscular dystrophy, limb-girdle, type 1B
159440	Charcot-Marie-Tooth neuropathy-1B, 118200
159440	Dejerine-Sottas disease, myelin P-related, 145900
159440	Hypomyelination, congenital
160900	Myotonic dystrophy
164040	Leukemia, acute promyelocytic, NPM/RARA type
164953	Liposarcoma
168360	Paraneoplastic sensory neuropathy
168468	Metaphyseal chondrodysplasia, Murk Jansen type, 156400
169600	Hailey-Hailey disease
171760	Hypophosphatasia, adult, 146300
171760	Hypophosphatasia, infantile, 241500
172471	Glycogenosis, hepatic, autosomal
173610	Platelet alpha/delta storage pool deficiency
173850	Polio, susceptibility to
174000	Medullary cystic kidney disease, AD
174900	Polyposis, juvenile intestinal
176100	Porphyria cutanea tarda
176100	Porphyria, hepatoerythropoietic
178300	Ptosis, hereditary congenital, 1
179755	Renal cell carcinoma, papillary, 1
179820	[Hyperproreninemia]
180071	Retinitis pigmentosa, autosomal recessive
180250	Retinol binding protein, deficiency of
180380	Night blindness, congenital stationary, rhodopsin-related
180380	Retinitis pigmentosa, autosomal recessive
180380	Retinitis pigmentosa-4, autosomal dominant
181430	Scapuloperoneal syndrome, myopathic type
182280	Small-cell cancer of lung
182380	Glucose/galactose malabsorption
182381	Renal glucosuria, 253100
182860	Pyropoikilocytosis

182860	Spherocytosis, recessive
182860	Elliptocytosis-2
186580	Arthrocutaneouveal granulomatosis
186770	Leukemia, T-cell acute lymphocytic
186780	CD3, zeta chain, deficiency
186960	Leukemia/lymphoma, T-cell
187040	Leukemia-1, T-cell acute lymphoblastic
188070	Bleeding disorder due to defective thromboxane A2 receptor
188550	Thyroid papillary carcinoma
188826	Sorsby fundus dystrophy, 136900
189800	Preeclampsia/eclampsia
190000	Atransferrinemia
190040	Dermatofibrosarcoma protuberans
190040	Giant-cell fibroblastoma
190040	Meningioma, SIS-related
190182	Colon cancer
190182	Colorectal cancer, familial nonpolyposis, type 6
191030	Nemaline myopathy-1, 161800
191044	Cardiomyopathy, familial hypertrophic
191045	Cardiomyopathy, familial hypertrophic, 2, 115195
191092	Tuberous sclerosis-2
191315	Insensitivity to pain, congenital, with anhidrosis, 256800
192340	Diabetes insipidus, neurohypophyseal, 125700
203500	Alkaptonuria
208100	Arthrogryposis multiplex congenita, neurogenic
208250	Jacobs syndrome
217030	C3b inactivator deficiency
222900	Sucrose intolerance
227646	Fanconi anemia, type D
230000	Fucosidosis
230800	Gaucher disease
230800	Gaucher disease with cardiovascular calcification
231200	Bernard-Soulier syndrome
231550	Achalasia-addisonianism-alacrimia syndrome
232050	Propionicacidemia, type II or pccB type
233710	Chronic granulomatous disease due to deficiency of NCF-2
234200	Neurodegeneration with brain iron accumulation
236730	Urofacial syndrome
245200	Krabbe disease
246450	HMG-CoA lyase deficiency
246530	Leukotriene C4 synthase deficiency
247200	Miller-Dieker lissencephaly syndrome
248510	Mannosidosis, beta-
250100	Metachromatic leukodystrophy
250800	Methemoglobinemia, type I
250800	Methemoglobinemia, type II

252940	Sanfilippo syndrome, type D
254210	Myasthenia gravis, familial infantile
255800	Schwartz-Jampel syndrome
256540	Galactosialidosis
258501	3-methylglutaconicaciduria, type III
261510	Pseudo-Zellweger syndrome
262850	Plasmin inhibitor deficiency
264700	Pseudo-vitamin D dependency rickets 1
266200	Anemia, hemolytic, due to PK deficiency
271245	Spinocerebellar ataxia-8, infantile, with sensory neuropathy
271900	Canavan disease
276901	Usher syndrome, type 2
276902	Usher syndrome, type 3
278000	Wolman disease
278000	Cholesteryl ester storage disease
300008	Nephrolithiasis, type I, 310468
300008	Proteinuria, low molecular weight, with hypercalciuric nephrocalcinosis
300008	Dent disease, 300009
300008	Hypophosphatemia, type III
300047	Mental retardation, X-linked 20
301000	Thrombocytopenia, X-linked, 313900
301000	Wiskott-Aldrich syndrome
301220	Partington syndrome II
301300	Anemia, sideroblastic/hypochromic
301830	Arthrogryposis, X-linked (spinal muscular atrophy, infantile, X-linked)
302350	Nance-Horan syndrome
305400	Aarskog-Scott syndrome
306400	Chronic granulomatous disease, X-linked
308300	Incontinentia pigmenti, sporadic type
309470	Mental retardation, X-linked, syndromic-3, with spastic diplegia
309500	Renpenning syndrome-1
309585	Mental retardation, X-linked, syndromic-6, with gynecomastia and obesity
309610	Mental retardation, X-linked, syndromic-2, with dysmorphism and cerebral atrophy
311050	Optic atrophy, X-linked
311250	Ornithine transcarbamylase deficiency
312040	N syndrome, 310465
312610	Retinitis pigmentosa-3
314850	McLeod phenotype
600040	Colorectal cancer
600059	Retinitis pigmentosa-13
600095	Split hand/foot malformation, type 3
600101	Deafness, autosomal dominant 2

600105	Retinitis pigmentosa-12, autosomal recessive
600138	Retinitis pigmentosa-11
600140	Rubenstein-Taybi syndrome, 180849
600163	Long QT syndrome-3
600179	Leber congenital amaurosis, type I, 204000
600194	Ichthyosis bullosa of Siemens, 146800
600231	Palmoplantar keratoderma, Bothnia type
600273	Polycystic kidney disease, infantile severe, with tuberous sclerosis
600281	Non-insulin-dependent diabetes mellitus, 125853
600281	MODY, type 1, 125850
600332	Rippling muscle disease-1
600334	Tibial muscular dystrophy
600511	Schizophrenia-3
600512	Epilepsy, partial
600536	Myopathy, congenital
600584	Atrial septal defect with atrioventricular conduction defects, 108900
600650	Myopathy due to CPT II deficiency, 255110
600650	CPT deficiency, hepatic, type II, 600649
600722	Ceroid lipofuscinosis, neuronal, variant juvenile type, with granular osmiophilic deposits
600722	Ceroid lipofuscinosis, neuronal-1, infantile, 256730
600759	Alzheimer disease-4
600808	Enuresis, nocturnal, 2
600835	AIDS, resistance to
600882	Charcot-Marie-Tooth neuropathy-2B
600897	Cataract, zonular pulverulent-1, 116200
600919	Long QT syndrome-4 with sinus bradycardia
600923	Porphyria variegata, 176200
600956	Persistent Mullerian duct syndrome, type II, 261550
600957	Persistent Mullerian duct syndrome, type I, 261550
600977	Cone dystrophy, progressive
600995	Nephrotic syndrome, idiopathic, steroid-resistant
601105	Pycnodysostosis, 265800
601107	Dubin-Johnson syndrome, 237500
601130	Tolbutamide poor metabolizer
601154	Cardiomyopathy, dilated, 1E
601199	Neonatal hyperparathyroidism, 239200
601199	Hypocalcemia, autosomal dominant, 601198
601199	Hypocalciuric hypercalcemia, type I, 145980
601202	Cataract, anterior polar-2
601238	Cerebellar ataxia, Cayman type
601284	Hereditary hemorrhagic telangiectasia-2, 600376
601313	Polycystic kidney disease, adult type I, 173900
601412	Deafness, autosomal dominant 7
601471	Moebius syndrome-2
601494	Cardiomyopathy, familial, dilated-2

601518	Prostate cancer, hereditary, 1, 176807
601542	Rieger syndrome, type 1, 180500
601545	Lissencephaly-1
601556	Spinocerebellar ataxia-1, 164400
601652	Glaucoma 1A, primary open angle, juvenile-onset, 137750
601682	Glaucoma 1C, primary open angle
601744	Systemic lupus erythematosus, susceptibility to, 1
601769	Osteoporosis, involutional
601769	Rickets, vitamin D-resistant, 277440
601777	Cone dystrophy, progressive
601785	Carbohydrate-deficient glycoprotein syndrome, type I, 212065
601841	Protein C inhibitor deficiency
601846	Muscular dystrophy with rimmed vacuoles
601928	Monilethrix, 158000
601975	Ectodermal dysplasia/skin fragility syndrome
602014	Hypomagnesemia with secondary hypocalcemia
602082	Corneal dystrophy, Thiel-Behnke type
602116	Glioma
602153	Monilethrix, 158000
602216	Peutz-Jeghers syndrome, 175200
602225	Cone-rod retinal dystrophy-2, 120970
602225	Leber congenital amaurosis, type III
602477	Febrile convulsions, familial, 2
602491	Hyperlipidemia, familial combined, 1

Polynucleotide and Polypeptide Variants

[89] The present invention is directed to variants of the polynucleotide sequence disclosed in SEQ ID NO:X or the complementary strand thereto, nucleotide sequences encoding the polypeptide of SEQ ID NO:Y, the nucleotide sequence of SEQ ID NO:X encoding the polypeptide sequence as defined in column 7 of Table 1A, nucleotide sequences encoding the polypeptide as defined in column 7 of Table 1A, the nucleotide sequence as defined in columns 8 and 9 of Table 2, nucleotide sequences encoding the polypeptide encoded by the nucleotide sequence as defined in columns 8 and 9 of Table 2, the nucleotide sequence as defined in column 6 of Table 1B, nucleotide sequences encoding the polypeptide encoded by the nucleotide sequence as defined in column 6 of Table 1B, the cDNA sequence contained in Clone ID NO:Z, and/or nucleotide sequences encoding the polypeptide encoded by the cDNA sequence contained in Clone ID NO:Z.

[90] The present invention also encompasses variants of the polypeptide sequence disclosed in SEQ ID NO:Y, the polypeptide sequence as defined in column 7 of Table 1A, a polypeptide sequence encoded by the polynucleotide sequence in SEQ ID NO:X, a polypeptide sequence encoded by the nucleotide sequence as defined in columns 8 and 9 of Table 2, a polypeptide sequence encoded by the nucleotide sequence as defined in column 6 of Table 1B, a polypeptide sequence encoded by the complement of the polynucleotide sequence in SEQ ID NO:X, and/or a polypeptide sequence encoded by the cDNA sequence contained in Clone ID NO:Z.

[91] "Variant" refers to a polynucleotide or polypeptide differing from the polynucleotide or polypeptide of the present invention, but retaining essential properties thereof. Generally, variants are overall closely similar, and, in many regions, identical to the polynucleotide or polypeptide of the present invention.

[92] Thus, one aspect of the invention provides an isolated nucleic acid molecule comprising, or alternatively consisting of, a polynucleotide having a nucleotide sequence selected from the group consisting of: (a) a nucleotide sequence described in SEQ ID NO:X or contained in the cDNA sequence of Clone ID NO:Z; (b) a nucleotide sequence in SEQ ID NO:X or the cDNA in Clone ID NO:Z which encodes the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; (c) a nucleotide sequence in SEQ ID NO:X or the cDNA in Clone ID NO:Z which encodes a mature polypeptide; (d) a nucleotide sequence in SEQ ID NO:X or the cDNA sequence of Clone ID NO:Z, which encodes a biologically active fragment of a polypeptide;

(e) a nucleotide sequence in SEQ ID NO:X or the cDNA sequence of Clone ID NO:Z, which encodes an antigenic fragment of a polypeptide; (f) a nucleotide sequence encoding a polypeptide comprising the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; (g) a nucleotide sequence encoding a mature polypeptide of the amino acid sequence of SEQ ID NO:Y or the amino acid sequence encoded by the cDNA in Clone ID NO:Z; (h) a nucleotide sequence encoding a biologically active fragment of a polypeptide having the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; (i) a nucleotide sequence encoding an antigenic fragment of a polypeptide having the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; and (j) a nucleotide sequence complementary to any of the nucleotide sequences in (a), (b), (c), (d), (e), (f), (g), (h), or (i) above.

[93] The present invention is also directed to nucleic acid molecules which comprise, or alternatively consist of, a nucleotide sequence which is at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100%, identical to, for example, any of the nucleotide sequences in (a), (b), (c), (d), (e), (f), (g), (h), (i), or (j) above, the nucleotide coding sequence in SEQ ID NO:X or the complementary strand thereto, the nucleotide coding sequence of the cDNA contained in Clone ID NO:Z or the complementary strand thereto, a nucleotide sequence encoding the polypeptide of SEQ ID NO:Y, a nucleotide sequence encoding a polypeptide sequence encoded by the nucleotide sequence in SEQ ID NO:X, a polypeptide sequence encoded by the complement of the polynucleotide sequence in SEQ ID NO:X, a nucleotide sequence encoding the polypeptide encoded by the cDNA contained in Clone ID NO:Z, the nucleotide coding sequence in SEQ ID NO:X as defined in columns 8 and 9 of Table 2 or the complementary strand thereto, a nucleotide sequence encoding the polypeptide encoded by the nucleotide sequence in SEQ ID NO:X as defined in columns 8 and 9 of Table 2 or the complementary strand thereto, the nucleotide coding sequence in SEQ ID NO:B as defined in column 6 of Table 1B or the complementary strand thereto, a nucleotide sequence encoding the polypeptide encoded by the nucleotide sequence in SEQ ID NO:B as defined in column 6 of Table 1B or the complementary strand thereto, the nucleotide sequence in SEQ ID NO:X encoding the polypeptide sequence as defined in column 7 of Table 1A or the complementary strand thereto, nucleotide sequences encoding the polypeptide as defined in column 7 of Table 1A or the complementary strand thereto,

and/or polynucleotide fragments of any of these nucleic acid molecules (e.g., those fragments described herein). Polynucleotides which hybridize to the complement of these nucleic acid molecules under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention, as are polypeptides encoded by these polynucleotides and nucleic acids.

[94] In a preferred embodiment, the invention encompasses nucleic acid molecules which comprise, or alternatively, consist of a polynucleotide which hybridizes under stringent hybridization conditions, or alternatively, under lower stringency conditions, to a polynucleotide in (a), (b), (c), (d), (e), (f), (g), (h), or (i), above, as are polypeptides encoded by these polynucleotides. In another preferred embodiment, polynucleotides which hybridize to the complement of these nucleic acid molecules under stringent hybridization conditions, or alternatively, under lower stringency conditions, are also encompassed by the invention, as are polypeptides encoded by these polynucleotides.

[95] In another embodiment, the invention provides a purified protein comprising, or alternatively consisting of, a polypeptide having an amino acid sequence selected from the group consisting of: (a) the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; (b) the amino acid sequence of a mature form of a polypeptide having the amino acid sequence of SEQ ID NO:Y or the amino acid sequence encoded by the cDNA in Clone ID NO:Z; (c) the amino acid sequence of a biologically active fragment of a polypeptide having the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z; and (d) the amino acid sequence of an antigenic fragment of a polypeptide having the complete amino acid sequence of SEQ ID NO:Y or the complete amino acid sequence encoded by the cDNA in Clone ID NO:Z.

[96] The present invention is also directed to proteins which comprise, or alternatively consist of, an amino acid sequence which is at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100%, identical to, for example, any of the amino acid sequences in (a), (b), (c), or (d), above, the amino acid sequence shown in SEQ ID NO:Y, the amino acid sequence encoded by the cDNA contained in Clone ID NO:Z, the amino acid sequence of the polypeptide encoded by the nucleotide sequence in SEQ ID NO:X as defined in columns 8 and 9 of Table 2, the amino acid sequence of the polypeptide encoded by the nucleotide sequence in SEQ ID NO:B as defined in column 6 of Table 1B, the amino acid sequence as defined in column 7 of Table 1A, an amino acid sequence encoded by the nucleotide

sequence in SEQ ID NO:X, and an amino acid sequence encoded by the complement of the polynucleotide sequence in SEQ ID NO:X. Fragments of these polypeptides are also provided (e.g., those fragments described herein). Further proteins encoded by polynucleotides which hybridize to the complement of the nucleic acid molecules encoding these amino acid sequences under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention, as are the polynucleotides encoding these proteins.

[97] By a nucleic acid having a nucleotide sequence at least, for example, 95% "identical" to a reference nucleotide sequence of the present invention, it is intended that the nucleotide sequence of the nucleic acid is identical to the reference sequence except that the nucleotide sequence may include up to five point mutations per each 100 nucleotides of the reference nucleotide sequence encoding the polypeptide. In other words, to obtain a nucleic acid having a nucleotide sequence at least 95% identical to a reference nucleotide sequence, up to 5% of the nucleotides in the reference sequence may be deleted or substituted with another nucleotide, or a number of nucleotides up to 5% of the total nucleotides in the reference sequence may be inserted into the reference sequence. The query sequence may be an entire sequence referred to in Table 1A or 2 as the ORF (open reading frame), or any fragment specified as described herein.

[98] As a practical matter, whether any particular nucleic acid molecule or polypeptide is at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to a nucleotide sequence of the present invention can be determined conventionally using known computer programs. A preferred method for determining the best overall match between a query sequence (a sequence of the present invention) and a subject sequence, also referred to as a global sequence alignment, can be determined using the FASTDB computer program based on the algorithm of Brutlag et al. (Comp. App. Biosci. 6:237-245 (1990)). In a sequence alignment the query and subject sequences are both DNA sequences. An RNA sequence can be compared by converting U's to T's. The result of said global sequence alignment is expressed as percent identity. Preferred parameters used in a FASTDB alignment of DNA sequences to calculate percent identity are: Matrix=Unitary, k-tuple=4, Mismatch Penalty=1, Joining Penalty=30, Randomization Group Length=0, Cutoff Score=1, Gap Penalty=5, Gap Size Penalty 0.05, Window Size=500 or the length of the subject nucleotide sequence, whichever is shorter.

[99] If the subject sequence is shorter than the query sequence because of 5' or 3'

deletions, not because of internal deletions, a manual correction must be made to the results. This is because the FASTDB program does not account for 5' and 3' truncations of the subject sequence when calculating percent identity. For subject sequences truncated at the 5' or 3' ends, relative to the query sequence, the percent identity is corrected by calculating the number of bases of the query sequence that are 5' and 3' of the subject sequence, which are not matched/aligned, as a percent of the total bases of the query sequence. Whether a nucleotide is matched/aligned is determined by results of the FASTDB sequence alignment. This percentage is then subtracted from the percent identity, calculated by the above FASTDB program using the specified parameters, to arrive at a final percent identity score. This corrected score is what is used for the purposes of the present invention. Only bases outside the 5' and 3' bases of the subject sequence, as displayed by the FASTDB alignment, which are not matched/aligned with the query sequence, are calculated for the purposes of manually adjusting the percent identity score.

[100] For example, a 90 base subject sequence is aligned to a 100 base query sequence to determine percent identity. The deletions occur at the 5' end of the subject sequence and therefore, the FASTDB alignment does not show a matched/alignment of the first 10 bases at 5' end. The 10 unpaired bases represent 10% of the sequence (number of bases at the 5' and 3' ends not matched/total number of bases in the query sequence) so 10% is subtracted from the percent identity score calculated by the FASTDB program. If the remaining 90 bases were perfectly matched the final percent identity would be 90%. In another example, a 90 base subject sequence is compared with a 100 base query sequence. This time the deletions are internal deletions so that there are no bases on the 5' or 3' of the subject sequence which are not matched/aligned with the query. In this case the percent identity calculated by FASTDB is not manually corrected. Once again, only bases 5' and 3' of the subject sequence which are not matched/aligned with the query sequence are manually corrected for. No other manual corrections are to be made for the purposes of the present invention.

[101] By a polypeptide having an amino acid sequence at least, for example, 95% "identical" to a query amino acid sequence of the present invention, it is intended that the amino acid sequence of the subject polypeptide is identical to the query sequence except that the subject polypeptide sequence may include up to five amino acid alterations per each 100 amino acids of the query amino acid sequence. In other words, to obtain a polypeptide having an amino acid sequence at least 95% identical to a query amino acid sequence, up to

5% of the amino acid residues in the subject sequence may be inserted, deleted, (indels) or substituted with another amino acid. These alterations of the reference sequence may occur at the amino or carboxy terminal positions of the reference amino acid sequence or anywhere between those terminal positions, interspersed either individually among residues in the reference sequence or in one or more contiguous groups within the reference sequence.

[102] As a practical matter, whether any particular polypeptide is at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to, for instance, the amino acid sequence of a polypeptide referred to in Table 1A (e.g., the amino acid sequence identified in column 6) or Table 2 (e.g., the amino acid sequence of the polypeptide encoded by the polynucleotide sequence defined in columns 8 and 9 of Table 2) or a fragment thereof, the amino acid sequence of the polypeptide encoded by the polynucleotide sequence in SEQ ID NO:B as defined in column 6 of Table 1B or a fragment thereof, the amino acid sequence of the polypeptide encoded by the nucleotide sequence in SEQ ID NO:X or a fragment thereof, or the amino acid sequence of the polypeptide encoded by cDNA contained in Clone ID NO:Z, or a fragment thereof, can be determined conventionally using known computer programs. A preferred method for determining the best overall match between a query sequence (a sequence of the present invention) and a subject sequence, also referred to as a global sequence alignment, can be determined using the FASTDB computer program based on the algorithm of Brutlag et al. (Comp. App. Biosci.6:237-245 (1990)). In a sequence alignment the query and subject sequences are either both nucleotide sequences or both amino acid sequences. The result of said global sequence alignment is expressed as percent identity. Preferred parameters used in a FASTDB amino acid alignment are: Matrix=PAM 0, k-tuple=2, Mismatch Penalty=1, Joining Penalty=20, Randomization Group Length=0, Cutoff Score=1, Window Size=sequence length, Gap Penalty=5, Gap Size Penalty=0.05, Window Size=500 or the length of the subject amino acid sequence, whichever is shorter.

[103] If the subject sequence is shorter than the query sequence due to N- or C-terminal deletions, not because of internal deletions, a manual correction must be made to the results. This is because the FASTDB program does not account for N- and C-terminal truncations of the subject sequence when calculating global percent identity. For subject sequences truncated at the N- and C-termini, relative to the query sequence, the percent identity is corrected by calculating the number of residues of the query sequence that are N- and C-terminal of the subject sequence, which are not matched/aligned with a corresponding

subject residue, as a percent of the total bases of the query sequence. Whether a residue is matched/aligned is determined by results of the FASTDB sequence alignment. This percentage is then subtracted from the percent identity, calculated by the above FASTDB program using the specified parameters, to arrive at a final percent identity score. This final percent identity score is what is used for the purposes of the present invention. Only residues to the N- and C-termini of the subject sequence, which are not matched/aligned with the query sequence, are considered for the purposes of manually adjusting the percent identity score. That is, only query residue positions outside the farthest N- and C- terminal residues of the subject sequence.

[104] For example, a 90 amino acid residue subject sequence is aligned with a 100 residue query sequence to determine percent identity. The deletion occurs at the N-terminus of the subject sequence and therefore, the FASTDB alignment does not show a matching/alignment of the first 10 residues at the N-terminus. The 10 unpaired residues represent 10% of the sequence (number of residues at the N- and C- termini not matched/total number of residues in the query sequence) so 10% is subtracted from the percent identity score calculated by the FASTDB program. If the remaining 90 residues were perfectly matched the final percent identity would be 90%. In another example, a 90 residue subject sequence is compared with a 100 residue query sequence. This time the deletions are internal deletions so there are no residues at the N- or C-termini of the subject sequence which are not matched/aligned with the query. In this case the percent identity calculated by FASTDB is not manually corrected. Once again, only residue positions outside the N- and C-terminal ends of the subject sequence, as displayed in the FASTDB alignment, which are not matched/aligned with the query sequence are manually corrected for. No other manual corrections are to be made for the purposes of the present invention.

[105] The polynucleotide variants of the invention may contain alterations in the coding regions, non-coding regions, or both. Especially preferred are polynucleotide variants containing alterations which produce silent substitutions, additions, or deletions, but do not alter the properties or activities of the encoded polypeptide. Nucleotide variants produced by silent substitutions due to the degeneracy of the genetic code are preferred. Moreover, polypeptide variants in which less than 50, less than 40, less than 30, less than 20, less than 10, or 5-50, 5-25, 5-10, 1-5, or 1-2 amino acids are substituted, deleted, or added in any combination are also preferred. Polynucleotide variants can be produced for a

variety of reasons, e.g., to optimize codon expression for a particular host (change codons in the human mRNA to those preferred by a bacterial host such as *E. coli*).

[106] Naturally occurring variants are called "allelic variants," and refer to one of several alternate forms of a gene occupying a given locus on a chromosome of an organism. (Genes II, Lewin, B., ed., John Wiley & Sons, New York (1985)). These allelic variants can vary at either the polynucleotide and/or polypeptide level and are included in the present invention. Alternatively, non-naturally occurring variants may be produced by mutagenesis techniques or by direct synthesis.

[107] Using known methods of protein engineering and recombinant DNA technology, variants may be generated to improve or alter the characteristics of the polypeptides of the present invention. For instance, one or more amino acids can be deleted from the N-terminus or C-terminus of the polypeptide of the present invention without substantial loss of biological function. As an example, Ron et al. (*J. Biol. Chem.* 268: 2984-2988 (1993)) reported variant KGF proteins having heparin binding activity even after deleting 3, 8, or 27 amino-terminal amino acid residues. Similarly, Interferon gamma exhibited up to ten times higher activity after deleting 8-10 amino acid residues from the carboxy terminus of this protein. (Dobeli et al., *J. Biotechnology* 7:199-216 (1988).)

[108] Moreover, ample evidence demonstrates that variants often retain a biological activity similar to that of the naturally occurring protein. For example, Gayle and coworkers (*J. Biol. Chem.* 268:22105-22111 (1993)) conducted extensive mutational analysis of human cytokine IL-1a. They used random mutagenesis to generate over 3,500 individual IL-1a mutants that averaged 2.5 amino acid changes per variant over the entire length of the molecule. Multiple mutations were examined at every possible amino acid position. The investigators found that "[m]ost of the molecule could be altered with little effect on either [binding or biological activity]." In fact, only 23 unique amino acid sequences, out of more than 3,500 nucleotide sequences examined, produced a protein that significantly differed in activity from wild-type.

[109] Furthermore, even if deleting one or more amino acids from the N-terminus or C-terminus of a polypeptide results in modification or loss of one or more biological functions, other biological activities may still be retained. For example, the ability of a deletion variant to induce and/or to bind antibodies which recognize the secreted form will likely be retained when less than the majority of the residues of the secreted form are removed from the N-terminus or C-terminus. Whether a particular polypeptide lacking N-

or C-terminal residues of a protein retains such immunogenic activities can readily be determined by routine methods described herein and otherwise known in the art.

[110] Thus, the invention further includes polypeptide variants which show a functional activity (e.g., biological activity) of the polypeptides of the invention. Such variants include deletions, insertions, inversions, repeats, and substitutions selected according to general rules known in the art so as have little effect on activity.

[111] The present application is directed to nucleic acid molecules at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100% identical to the nucleic acid sequences disclosed herein, (e.g., encoding a polypeptide having the amino acid sequence of an N and/or C terminal deletion), irrespective of whether they encode a polypeptide having functional activity. This is because even where a particular nucleic acid molecule does not encode a polypeptide having functional activity, one of skill in the art would still know how to use the nucleic acid molecule, for instance, as a hybridization probe or a polymerase chain reaction (PCR) primer. Uses of the nucleic acid molecules of the present invention that do not encode a polypeptide having functional activity include, inter alia, (1) isolating a gene or allelic or splice variants thereof in a cDNA library; (2) *in situ* hybridization (e.g., "FISH") to metaphase chromosomal spreads to provide precise chromosomal location of the gene, as described in Verma et al., Human Chromosomes: A Manual of Basic Techniques, Pergamon Press, New York (1988); (3) Northern Blot analysis for detecting mRNA expression in specific tissues (e.g., normal or diseased tissues); and (4) *in situ* hybridization (e.g., histochemistry) for detecting mRNA expression in specific tissues (e.g., normal or diseased tissues).

[112] Preferred, however, are nucleic acid molecules having sequences at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99% or 100% identical to the nucleic acid sequences disclosed herein, which do, in fact, encode a polypeptide having functional activity. By a polypeptide having "functional activity" is meant, a polypeptide capable of displaying one or more known functional activities associated with a full-length (complete) protein of the invention. Such functional activities include, but are not limited to, biological activity, antigenicity [ability to bind (or compete with a polypeptide of the invention for binding) to an anti-polypeptide of the invention antibody], immunogenicity (ability to generate antibody which binds to a specific polypeptide of the invention), ability to form multimers with polypeptides of the invention, and ability to bind to a receptor or ligand for a polypeptide of the invention.

[113] The functional activity of the polypeptides, and fragments, variants and derivatives of the invention, can be assayed by various methods.

[114] For example, in one embodiment where one is assaying for the ability to bind or compete with a full-length polypeptide of the present invention for binding to an anti-polypeptide antibody, various immunoassays known in the art can be used, including but not limited to, competitive and non-competitive assay systems using techniques such as radioimmunoassays, ELISA (enzyme linked immunosorbent assay), "sandwich" immunoassays, immunoradiometric assays, gel diffusion precipitation reactions, immunodiffusion assays, in situ immunoassays (using colloidal gold, enzyme or radioisotope labels, for example), western blots, precipitation reactions, agglutination assays (e.g., gel agglutination assays, hemagglutination assays), complement fixation assays, immunofluorescence assays, protein A assays, and immunoelectrophoresis assays, etc. In one embodiment, antibody binding is detected by detecting a label on the primary antibody. In another embodiment, the primary antibody is detected by detecting binding of a secondary antibody or reagent to the primary antibody. In a further embodiment, the secondary antibody is labeled. Many means are known in the art for detecting binding in an immunoassay and are within the scope of the present invention.

[115] In another embodiment, where a ligand is identified, or the ability of a polypeptide fragment, variant or derivative of the invention to multimerize is being evaluated, binding can be assayed, e.g., by means well-known in the art, such as, for example, reducing and non-reducing gel chromatography, protein affinity chromatography, and affinity blotting. See generally, Phizicky et al., Microbiol. Rev. 59:94-123 (1995). In another embodiment, the ability of physiological correlates of a polypeptide of the present invention to bind to a substrate(s) of the polypeptide of the invention can be routinely assayed using techniques known in the art.

[116] In addition, assays described herein (see Examples) and otherwise known in the art may routinely be applied to measure the ability of polypeptides of the present invention and fragments, variants and derivatives thereof to elicit polypeptide related biological activity (either *in vitro* or *in vivo*). Other methods will be known to the skilled artisan and are within the scope of the invention.

[117] Of course, due to the degeneracy of the genetic code, one of ordinary skill in the art will immediately recognize that a large number of the nucleic acid molecules having a sequence at least 80%, 85%, 90%, 95%, 96%, 97%, 98%, 99%, or 100% identical to, for

example, the nucleic acid sequence of the cDNA contained in Clone ID NO:Z, the nucleic acid sequence referred to in Table 1A (SEQ ID NO:X), the nucleic acid sequence disclosed in Table 2 (e.g., the nucleic acid sequence delineated in columns 8 and 9) or fragments thereof, will encode polypeptides "having functional activity." In fact, since degenerate variants of any of these nucleotide sequences all encode the same polypeptide, in many instances, this will be clear to the skilled artisan even without performing the above described comparison assay. It will be further recognized in the art that, for such nucleic acid molecules that are not degenerate variants, a reasonable number will also encode a polypeptide having functional activity. This is because the skilled artisan is fully aware of amino acid substitutions that are either less likely or not likely to significantly effect protein function (e.g., replacing one aliphatic amino acid with a second aliphatic amino acid), as further described below.

[118] For example, guidance concerning how to make phenotypically silent amino acid substitutions is provided in Bowie et al., "Deciphering the Message in Protein Sequences: Tolerance to Amino Acid Substitutions," *Science* 247:1306-1310 (1990), wherein the authors indicate that there are two main strategies for studying the tolerance of an amino acid sequence to change.

[119] The first strategy exploits the tolerance of amino acid substitutions by natural selection during the process of evolution. By comparing amino acid sequences in different species, conserved amino acids can be identified. These conserved amino acids are likely important for protein function. In contrast, the amino acid positions where substitutions have been tolerated by natural selection indicates that these positions are not critical for protein function. Thus, positions tolerating amino acid substitution could be modified while still maintaining biological activity of the protein.

[120] The second strategy uses genetic engineering to introduce amino acid changes at specific positions of a cloned gene to identify regions critical for protein function. For example, site directed mutagenesis or alanine-scanning mutagenesis (introduction of single alanine mutations at every residue in the molecule) can be used. See Cunningham and Wells, *Science* 244:1081-1085 (1989). The resulting mutant molecules can then be tested for biological activity.

[121] As the authors state, these two strategies have revealed that proteins are surprisingly tolerant of amino acid substitutions. The authors further indicate which amino acid changes are likely to be permissive at certain amino acid positions in the protein. For

example, most buried (within the tertiary structure of the protein) amino acid residues require nonpolar side chains, whereas few features of surface side chains are generally conserved. Moreover, tolerated conservative amino acid substitutions involve replacement of the aliphatic or hydrophobic amino acids Ala, Val, Leu and Ile; replacement of the hydroxyl residues Ser and Thr; replacement of the acidic residues Asp and Glu; replacement of the amide residues Asn and Gln, replacement of the basic residues Lys, Arg, and His; replacement of the aromatic residues Phe, Tyr, and Trp, and replacement of the small-sized amino acids Ala, Ser, Thr, Met, and Gly. Besides conservative amino acid substitution, variants of the present invention include (i) substitutions with one or more of the non-conserved amino acid residues, where the substituted amino acid residues may or may not be one encoded by the genetic code, or (ii) substitutions with one or more of the amino acid residues having a substituent group, or (iii) fusion of the mature polypeptide with another compound, such as a compound to increase the stability and/or solubility of the polypeptide (for example, polyethylene glycol), (iv) fusion of the polypeptide with additional amino acids, such as, for example, an IgG Fc fusion region peptide, serum albumin (preferably human serum albumin) or a fragment thereof, or leader or secretory sequence, or a sequence facilitating purification, or (v) fusion of the polypeptide with another compound, such as albumin (including but not limited to recombinant albumin (see, e.g., U.S. Patent No. 5,876,969, issued March 2, 1999, EP Patent 0 413 622, and U.S. Patent No. 5,766,883, issued June 16, 1998, herein incorporated by reference in their entirety)). Such variant polypeptides are deemed to be within the scope of those skilled in the art from the teachings herein.

[122] For example, polypeptide variants containing amino acid substitutions of charged amino acids with other charged or neutral amino acids may produce proteins with improved characteristics, such as less aggregation. Aggregation of pharmaceutical formulations both reduces activity and increases clearance due to the aggregate's immunogenic activity. See Pinckard et al., *Clin. Exp. Immunol.* 2:331-340 (1967); Robbins et al., *Diabetes* 36: 838-845 (1987); Cleland et al., *Crit. Rev. Therapeutic Drug Carrier Systems* 10:307-377 (1993).

[123] A further embodiment of the invention relates to polypeptides which comprise the amino acid sequence of a polypeptide having an amino acid sequence which contains at least one amino acid substitution, but not more than 50 amino acid substitutions, even more preferably, not more than 40 amino acid substitutions, still more preferably, not more than 30 amino acid substitutions, and still even more preferably, not more than 20 amino acid

substitutions from a polypeptide sequence disclosed herein. Of course it is highly preferable for a polypeptide to have an amino acid sequence which comprises the amino acid sequence of a polypeptide of SEQ ID NO:Y, an amino acid sequence encoded by SEQ ID NO:X, an amino acid sequence encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, an amino acid sequence encoded by the complement of SEQ ID NO:X, and/or an amino acid sequence encoded by cDNA contained in Clone ID NO:Z which contains, in order of ever-increasing preference, at least one, but not more than 10, 9, 8, 7, 6, 5, 4, 3, 2 or 1 amino acid substitutions.

[124] In specific embodiments, the polypeptides of the invention comprise, or alternatively, consist of, fragments or variants of a reference amino acid sequence selected from: (a) the amino acid sequence of SEQ ID NO:Y or fragments thereof (e.g., the mature form and/or other fragments described herein); (b) the amino acid sequence encoded by SEQ ID NO:X or fragments thereof; (c) the amino acid sequence encoded by the complement of SEQ ID NO:X or fragments thereof; (d) the amino acid sequence encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2 or fragments thereof; and (e) the amino acid sequence encoded by cDNA contained in Clone ID NO:Z or fragments thereof; wherein the fragments or variants have 1-5, 5-10, 5-25, 5-50, 10-50 or 50-150, amino acid residue additions, substitutions, and/or deletions when compared to the reference amino acid sequence. In preferred embodiments, the amino acid substitutions are conservative. Polynucleotides encoding these polypeptides are also encompassed by the invention.

Polynucleotide and Polypeptide Fragments

[125] The present invention is also directed to polynucleotide fragments of the polynucleotides (nucleic acids) of the invention. In the present invention, a "polynucleotide fragment" refers to a polynucleotide having a nucleic acid sequence which, for example: is a portion of the cDNA contained in Clone ID NO:Z or the complementary strand thereto; is a portion of the polynucleotide sequence encoding the polypeptide encoded by the cDNA contained in Clone ID NO:Z or the complementary strand thereto; is a portion of a polynucleotide sequence encoding the amino acid sequence encoded by the region of SEQ ID NO:X as defined in columns 8 and 9 of Table 2 or the complementary strand thereto; is a portion of the polynucleotide sequence of SEQ ID NO:X as defined in columns 8 and 9 of Table 2 or the complementary strand thereto; is a portion of the polynucleotide sequence in

SEQ ID NO:X or the complementary strand thereto; is a polynucleotide sequence encoding a portion of the polypeptide of SEQ ID NO:Y; is a polynucleotide sequence encoding a portion of a polypeptide encoded by SEQ ID NO:X; is a polynucleotide sequence encoding a portion of a polypeptide encoded by the complement of the polynucleotide sequence in SEQ ID NO:X; is a portion of a polynucleotide sequence encoding the amino acid sequence encoded by the region of SEQ ID NO:B as defined in column 6 of Table 1B or the complementary strand thereto; or is a portion of the polynucleotide sequence of SEQ ID NO:B as defined in column 6 of Table 1B or the complementary strand thereto.

[126] The polynucleotide fragments of the invention are preferably at least about 15 nt, and more preferably at least about 20 nt, still more preferably at least about 30 nt, and even more preferably, at least about 40 nt, at least about 50 nt, at least about 75 nt, or at least about 150 nt in length. A fragment "at least 20 nt in length," for example, is intended to include 20 or more contiguous bases from the cDNA sequence contained in Clone ID NO:Z, or the nucleotide sequence shown in SEQ ID NO:X or the complementary strand thereto. In this context "about" includes the particularly recited value or a value larger or smaller by several (5, 4, 3, 2, or 1) nucleotides, at either terminus or at both termini. These nucleotide fragments have uses that include, but are not limited to, as diagnostic probes and primers as discussed herein. Of course, larger fragments (e.g., at least 160, 170, 180, 190, 200, 250, 500, 600, 1000, or 2000 nucleotides in length) are also encompassed by the invention.

[127] Moreover, representative examples of polynucleotide fragments of the invention comprise, or alternatively consist of, a sequence from about nucleotide number 1-50, 51-100, 101-150, 151-200, 201-250, 251-300, 301-350, 351-400, 401-450, 451-500, 501-550, 551-600, 601-650, 651-700, 701-750, 751-800, 801-850, 851-900, 901-950, 951-1000, 1001-1050, 1051-1100, 1101-1150, 1151-1200, 1201-1250, 1251-1300, 1301-1350, 1351-1400, 1401-1450, 1451-1500, 1501-1550, 1551-1600, 1601-1650, 1651-1700, 1701-1750, 1751-1800, 1801-1850, 1851-1900, 1901-1950, 1951-2000, 2001-2050, 2051-2100, 2101-2150, 2151-2200, 2201-2250, 2251-2300, 2301-2350, 2351-2400, 2401-2450, 2451-2500, 2501-2550, 2551-2600, 2601-2650, 2651-2700, 2701-2750, 2751-2800, 2801-2850, 2851-2900, 2901-2950, 2951-3000, 3001-3050, 3051-3100, 3101-3150, 3151-3200, 3201-3250, 3251-3300, 3301-3350, 3351-3400, 3401-3450, 3451-3500, 3501-3550, 3551-3600, 3601-3650, 3651-3700, 3701-3750, 3751-3800, 3801-3850, 3851-3900, 3901-3950, 3951-4000, 4001-4050, 4051-4100, 4101-4150, 4151-4200, 4201-4250, 4251-4300, 4301-4350, 4351-

4400, 4401-4450, 4451-4500, 4501-4550, 4551-4600, 4601-4650, 4651-4700, 4701-4750, 4751-4800, 4801-4850, 4851-4900, 4901-4950, 4951-5000, 5001-5050, 5051-5100, 5101-5150, 5151-5200, 5201-5250, 5251-5300, 5301-5350, 5351-5400, 5401-5450, 5451-5500, 5501-5550, 5551-5600, 5601-5650, 5651-5700, 5701-5750, 5751-5800, 5801-5850, 5851-5900, 5901-5950, 5951-6000, 6001-6050, 6051-6100, 6101-6150, 6151-6200, 6201-6250, 6251-6300, 6301-6350, 6351-6400, 6401-6450, 6451-6500, 6501-6550, 6551-6600, 6601-6650, 6651-6700, 6701-6750, 6751-6800, 6801-6850, 6851-6900, 6901-6950, 6951-7000, 7001-7050, 7051-7100, 7101-7150, 7151-7200, 7201-7250, 7251-7300 or 7301 to the end of SEQ ID NO:X, or the complementary strand thereto. In this context "about" includes the particularly recited range or a range larger or smaller by several (5, 4, 3, 2, or 1) nucleotides, at either terminus or at both termini. Preferably, these fragments encode a polypeptide which has a functional activity (e.g., biological activity). More preferably, these polynucleotides can be used as probes or primers as discussed herein. Polynucleotides which hybridize to one or more of these polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions are also encompassed by the invention, as are polypeptides encoded by these polynucleotides.

[128] Further representative examples of polynucleotide fragments of the invention comprise, or alternatively consist of, a sequence from about nucleotide number 1-50, 51-100, 101-150, 151-200, 201-250, 251-300, 301-350, 351-400, 401-450, 451-500, 501-550, 551-600, 601-650, 651-700, 701-750, 751-800, 801-850, 851-900, 901-950, 951-1000, 1001-1050, 1051-1100, 1101-1150, 1151-1200, 1201-1250, 1251-1300, 1301-1350, 1351-1400, 1401-1450, 1451-1500, 1501-1550, 1551-1600, 1601-1650, 1651-1700, 1701-1750, 1751-1800, 1801-1850, 1851-1900, 1901-1950, 1951-2000, 2001-2050, 2051-2100, 2101-2150, 2151-2200, 2201-2250, 2251-2300, 2301-2350, 2351-2400, 2401-2450, 2451-2500, 2501-2550, 2551-2600, 2601-2650, 2651-2700, 2701-2750, 2751-2800, 2801-2850, 2851-2900, 2901-2950, 2951-3000, 3001-3050, 3051-3100, 3101-3150, 3151-3200, 3201-3250, 3251-3300, 3301-3350, 3351-3400, 3401-3450, 3451-3500, 3501-3550, 3551-3600, 3601-3650, 3651-3700, 3701-3750, 3751-3800, 3801-3850, 3851-3900, 3901-3950, 3951-4000, 4001-4050, 4051-4100, 4101-4150, 4151-4200, 4201-4250, 4251-4300, 4301-4350, 4351-4400, 4401-4450, 4451-4500, 4501-4550, 4551-4600, 4601-4650, 4651-4700, 4701-4750, 4751-4800, 4801-4850, 4851-4900, 4901-4950, 4951-5000, 5001-5050, 5051-5100, 5101-5150, 5151-5200, 5201-5250, 5251-5300, 5301-5350, 5351-5400, 5401-5450, 5451-5500, 5501-5550, 5551-5600, 5601-5650, 5651-5700, 5701-5750, 5751-5800, 5801-5850, 5851-

5900, 5901-5950, 5951-6000, 6001-6050, 6051-6100, 6101-6150, 6151-6200, 6201-6250, 6251-6300, 6301-6350, 6351-6400, 6401-6450, 6451-6500, 6501-6550, 6551-6600, 6601-6650, 6651-6700, 6701-6750, 6751-6800, 6801-6850, 6851-6900, 6901-6950, 6951-7000, 7001-7050, 7051-7100, 7101-7150, 7151-7200, 7201-7250, 7251-7300 or 7301 to the end of the cDNA sequence contained in Clone ID NO:Z, or the complementary strand thereto. In this context "about" includes the particularly recited range or a range larger or smaller by several (5, 4, 3, 2, or 1) nucleotides, at either terminus or at both termini. Preferably, these fragments encode a polypeptide which has a functional activity (e.g., biological activity). More preferably, these polynucleotides can be used as probes or primers as discussed herein. Polynucleotides which hybridize to one or more of these polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions are also encompassed by the invention, as are polypeptides encoded by these polynucleotides.

[129] Moreover, representative examples of polynucleotide fragments of the invention comprise, or alternatively consist of, a nucleic acid sequence comprising one, two, three, four, five, six, seven, eight, nine, ten, or more of the above described polynucleotide fragments of the invention in combination with a polynucleotide sequence delineated in Table 1B column 6. Additional, representative examples of polynucleotide fragments of the invention comprise, or alternatively consist of, a nucleic acid sequence comprising one, two, three, four, five, six, seven, eight, nine, ten, or more of the above described polynucleotide fragments of the invention in combination with a polynucleotide sequence that is the complementary strand of a sequence delineated in column 6 of Table 1B. In further embodiments, the above-described polynucleotide fragments of the invention comprise, or alternatively consist of, sequences delineated in Table 1B, column 6, and have a nucleic acid sequence which is different from that of the BAC fragment having the sequence disclosed in SEQ ID NO:B (see Table 1B, column 5). In additional embodiments, the above-described polynucleotide fragments of the invention comprise, or alternatively consist of, sequences delineated in Table 1B, column 6, and have a nucleic acid sequence which is different from that published for the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). In additional embodiments, the above-described polynucleotides of the invention comprise, or alternatively consist of, sequences delineated Table 1B, column 6, and have a nucleic acid sequence which is different from that contained in the BAC clone identified as BAC ID NO:A (see Table 1B, column 4). Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that

bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides and polypeptides are also encompassed by the invention.

[130] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more fragments of the sequences delineated in column 6 of Table 1B, and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1B, column 2) or fragments or variants thereof. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[131] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more fragments of the sequences delineated in column 6 of Table 1B which correspond to the same Clone ID NO:Z (see Table 1B, column 1), and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1A or 1B) or fragments or variants thereof. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[132] In further specific embodiments, polynucleotides of the invention comprise, or alternatively consist of, one, two, three, four, five, six, seven, eight, nine, ten, or more fragments of the sequences delineated in the same row of column 6 of Table 1B, and the polynucleotide sequence of SEQ ID NO:X (e.g., as defined in Table 1A or 1B) or fragments or variants thereof. Polypeptides encoded by these polynucleotides, other polynucleotides that encode these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention.

[133] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of the sequence of SEQ ID NO:X are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids that encode these polypeptides, and antibodies that

bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[134] In additional specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of a fragment or variant of the sequence of SEQ ID NO:X (e.g., as described herein) are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[135] In further specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of a fragment or variant of the sequence of SEQ ID NO:X and the 5' 10 polynucleotides of the sequence of one of the sequences delineated in column 6 of Table 1B are directly contiguous. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[136] In specific embodiments, polynucleotides of the invention comprise, or alternatively consist of a polynucleotide sequence in which the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B and the 5' 10 polynucleotides of another sequence in column 6 are directly contiguous. In preferred embodiments, the 3' 10 polynucleotides of one of the sequences delineated in column 6 of Table 1B is directly contiguous with the 5' 10 polynucleotides of the next sequential exon delineated in Table 1B, column 6. Nucleic acids which hybridize to the complement of these 20 contiguous polynucleotides under stringent hybridization conditions or alternatively, under lower

stringency conditions, are also encompassed by the invention. Polypeptides encoded by these polynucleotides and/or nucleic acids, other polynucleotides and/or nucleic acids encoding these polypeptides, and antibodies that bind these polypeptides are also encompassed by the invention. Additionally, fragments and variants of the above-described polynucleotides, nucleic acids, and polypeptides are also encompassed by the invention.

[137] In the present invention, a "polypeptide fragment" refers to an amino acid sequence which is a portion of that contained in SEQ ID NO:Y, a portion of an amino acid sequence encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, a portion of an amino acid sequence encoded by the polynucleotide sequence of SEQ ID NO:X, a portion of an amino acid sequence encoded by the complement of the polynucleotide sequence in SEQ ID NO:X, and/or a portion of an amino acid sequence encoded by the cDNA contained in Clone ID NO:Z. Protein (polypeptide) fragments may be "free-standing," or comprised within a larger polypeptide of which the fragment forms a part or region, most preferably as a single continuous region. Representative examples of polypeptide fragments of the invention, include, for example, fragments comprising, or alternatively consisting of, from about amino acid number 1-20, 21-40, 41-60, 61-80, 81-100, 101-120, 121-140, 141-160, 161-180, 181-200, 201-220, 221-240, 241-260, 261-280, 281-300, 301-320, 321-340, 341-360, 361-380, 381-400, 401-420, 421-440, 441-460, 461-480, 481-500, 501-520, 521-540, 541-560, 561-580, 581-600, 601-620, 621-640, 641-660, 661-680, 681-700, 701-720, 721-740, 741-760, 761-780, 781-800, 801-820, 821-840, 841-860, 861-880, 881-900, 901-920, 921-940, 941-960, 961-980, 981-1000, 1001-1020, 1021-1040, 1041-1060, 1061-1080, 1081-1100, 1101-1120, 1121-1140, 1141-1160, 1161-1180, 1181-1200, 1201-1220, 1221-1240, 1241-1260, 1261-1280, 1281-1300, 1301-1320, 1321-1340, 1341-1360, 1361-1380, 1381-1400, 1401-1420, 1421-1440, or 1441 to the end of the coding region of cDNA and SEQ ID NO: Y. In a preferred embodiment, polypeptide fragments of the invention include, for example, fragments comprising, or alternatively consisting of, from about amino acid number 1-20, 21-40, 41-60, 61-80, 81-100, 101-120, 121-140, 141-160, 161-180, 181-200, 201-220, 221-240, 241-260, 261-280, 281-300, 301-320, 321-340, 341-360, 361-380, 381-400, 401-420, 421-440, 441-460, 461-480, 481-500, 501-520, 521-540, 541-560, 561-580, 581-600, 601-620, 621-640, 641-660, 661-680, 681-700, 701-720, 721-740, 741-760, 761-780, 781-800, 801-820, 821-840, 841-860, 861-880, 881-900, 901-920, 921-940, 941-960, 961-980, 981-1000, 1001-1020, 1021-1040, 1041-1060, 1061-1080, 1081-1100, 1101-1120, 1121-1140, 1141-1160, 1161-1180, 1181-1200,

1201-1220, 1221-1240, 1241-1260, 1261-1280, 1281-1300, 1301-1320, 1321-1340, 1341-1360, 1361-1380, 1381-1400, 1401-1420, 1421-1440, or 1441 to the end of the coding region of SEQ ID NO:Y. Moreover, polypeptide fragments of the invention may be at least about 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 100, 110, 120, 130, 140, or 150 amino acids in length. In this context "about" includes the particularly recited ranges or values, or ranges or values larger or smaller by several (5, 4, 3, 2, or 1) amino acids, at either extreme or at both extremes. Polynucleotides encoding these polypeptide fragments are also encompassed by the invention.

[138] Even if deletion of one or more amino acids from the N-terminus of a protein results in modification or loss of one or more biological functions of the protein, other functional activities (e.g., biological activities, ability to multimerize, ability to bind a ligand) may still be retained. For example, the ability of shortened muteins to induce and/or bind to antibodies which recognize the complete or mature forms of the polypeptides generally will be retained when less than the majority of the residues of the complete or mature polypeptide are removed from the N-terminus. Whether a particular polypeptide lacking N-terminal residues of a complete polypeptide retains such immunologic activities can readily be determined by routine methods described herein and otherwise known in the art. It is not unlikely that a mutein with a large number of deleted N-terminal amino acid residues may retain some biological or immunogenic activities. In fact, peptides composed of as few as six amino acid residues may often evoke an immune response.

[139] Accordingly, polypeptide fragments include the secreted protein as well as the mature form. Further preferred polypeptide fragments include the secreted protein or the mature form having a continuous series of deleted residues from the amino or the carboxy terminus, or both. For example, any number of amino acids, ranging from 1-60, can be deleted from the amino terminus of either the secreted polypeptide or the mature form. Similarly, any number of amino acids, ranging from 1-30, can be deleted from the carboxy terminus of the secreted protein or mature form. Furthermore, any combination of the above amino and carboxy terminus deletions are preferred. Similarly, polynucleotides encoding these polypeptide fragments are also preferred.

[140] The present invention further provides polypeptides having one or more residues deleted from the amino terminus of the amino acid sequence of a polypeptide disclosed herein (e.g., a polypeptide of SEQ ID NO:Y, a polypeptide encoded by the polynucleotide sequence contained in SEQ ID NO:X or the complement thereof, a polypeptide encoded by

the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, a polypeptide encoded by the portion of SEQ ID NO:B as defined in column 6 of Table 1B, and/or a polypeptide encoded by the cDNA contained in Clone ID NO:Z). In particular, N-terminal deletions may be described by the general formula $m-q$, where q is a whole integer representing the total number of amino acid residues in a polypeptide of the invention (e.g., the polypeptide disclosed in SEQ ID NO:Y, or the polypeptide encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2), and m is defined as any integer ranging from 2 to $q-6$. Polynucleotides encoding these polypeptides are also encompassed by the invention.

[141] The present invention further provides polypeptides having one or more residues from the carboxy terminus of the amino acid sequence of a polypeptide disclosed herein (e.g., a polypeptide of SEQ ID NO:Y, a polypeptide encoded by the polynucleotide sequence contained in SEQ ID NO:X, a polypeptide encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, and/or a polypeptide encoded by the cDNA contained in Clone ID NO:Z). In particular, C-terminal deletions may be described by the general formula $1-n$, where n is any whole integer ranging from 6 to $q-1$, and where n corresponds to the position of amino acid residue in a polypeptide of the invention. Polynucleotides encoding these polypeptides are also encompassed by the invention.

[142] In addition, any of the above described N- or C-terminal deletions can be combined to produce a N- and C-terminal deleted polypeptide. The invention also provides polypeptides having one or more amino acids deleted from both the amino and the carboxyl termini, which may be described generally as having residues $m-n$ of a polypeptide encoded by SEQ ID NO:X (e.g., including, but not limited to, the preferred polypeptide disclosed as SEQ ID NO:Y and the polypeptide encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2), the cDNA contained in Clone ID NO:Z, and/or the complement thereof, where n and m are integers as described above. Polynucleotides encoding these polypeptides are also encompassed by the invention.

[143] Also as mentioned above, even if deletion of one or more amino acids from the C-terminus of a protein results in modification or loss of one or more biological functions of the protein, other functional activities (e.g., biological activities, ability to multimerize, ability to bind a ligand) may still be retained. For example the ability of the shortened mutein to induce and/or bind to antibodies which recognize the complete or mature forms of the polypeptide generally will be retained when less than the majority of the residues of the

complete or mature polypeptide are removed from the C-terminus. Whether a particular polypeptide lacking C-terminal residues of a complete polypeptide retains such immunologic activities can readily be determined by routine methods described herein and otherwise known in the art. It is not unlikely that a mutein with a large number of deleted C-terminal amino acid residues may retain some biological or immunogenic activities. In fact, peptides composed of as few as six amino acid residues may often evoke an immune response.

[144] The present application is also directed to proteins containing polypeptides at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to a polypeptide sequence set forth herein. In preferred embodiments, the application is directed to proteins containing polypeptides at least 80%, 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to polypeptides having the amino acid sequence of the specific N- and C-terminal deletions. Polynucleotides encoding these polypeptides are also encompassed by the invention.

[145] Any polypeptide sequence encoded by, for example, the polynucleotide sequences set forth as SEQ ID NO:X or the complement thereof, (presented, for example, in Tables 1A and 2), the cDNA contained in Clone ID NO:Z, or the polynucleotide sequence as defined in column 6 of Table 1B, may be analyzed to determine certain preferred regions of the polypeptide. For example, the amino acid sequence of a polypeptide encoded by a polynucleotide sequence of SEQ ID NO:X (e.g., the polypeptide of SEQ ID NO:Y and the polypeptide encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2) or the cDNA contained in Clone ID NO:Z may be analyzed using the default parameters of the DNASTAR computer algorithm (DNASTAR, Inc., 1228 S. Park St., Madison, WI 53715 USA; <http://www.dnastar.com/>).

[146] Polypeptide regions that may be routinely obtained using the DNASTAR computer algorithm include, but are not limited to, Garnier-Robson alpha-regions, beta-regions, turn-regions, and coil-regions; Chou-Fasman alpha-regions, beta-regions, and turn-regions; Kyte-Doolittle hydrophilic regions and hydrophobic regions; Eisenberg alpha- and beta-amphipathic regions; Karplus-Schulz flexible regions; Emini surface-forming regions; and Jameson-Wolf regions of high antigenic index. Among highly preferred polynucleotides of the invention in this regard are those that encode polypeptides comprising regions that combine several structural features, such as several (e.g., 1, 2, 3 or 4) of the features set out above.

[147] Additionally, Kyte-Doolittle hydrophilic regions and hydrophobic regions, Emini surface-forming regions, and Jameson-Wolf regions of high antigenic index (i.e., containing four or more contiguous amino acids having an antigenic index of greater than or equal to 1.5, as identified using the default parameters of the Jameson-Wolf program) can routinely be used to determine polypeptide regions that exhibit a high degree of potential for antigenicity. Regions of high antigenicity are determined from data by DNASTAR analysis by choosing values which represent regions of the polypeptide which are likely to be exposed on the surface of the polypeptide in an environment in which antigen recognition may occur in the process of initiation of an immune response.

[148] Preferred polypeptide fragments of the invention are fragments comprising, or alternatively, consisting of, an amino acid sequence that displays a functional activity (e.g. biological activity) of the polypeptide sequence of which the amino acid sequence is a fragment. By a polypeptide displaying a "functional activity" is meant a polypeptide capable of one or more known functional activities associated with a full-length protein, such as, for example, biological activity, antigenicity, immunogenicity, and/or multimerization, as described herein.

[149] Other preferred polypeptide fragments are biologically active fragments. Biologically active fragments are those exhibiting activity similar, but not necessarily identical, to an activity of the polypeptide of the present invention. The biological activity of the fragments may include an improved desired activity, or a decreased undesirable activity.

[150] In preferred embodiments, polypeptides of the invention comprise, or alternatively consist of, one, two, three, four, five or more of the antigenic fragments of the polypeptide of SEQ ID NO:Y, or portions thereof. Polynucleotides encoding these polypeptides are also encompassed by the invention.

[151] The present invention encompasses polypeptides comprising, or alternatively consisting of, an epitope of: the polypeptide sequence shown in SEQ ID NO:Y; a polypeptide sequence encoded by SEQ ID NO:X or the complementary strand thereto; the polypeptide sequence encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2; the polypeptide sequence encoded by the portion of SEQ ID NO:B as defined in column 6 of Table 1B or the complement thereto; the polypeptide sequence encoded by the cDNA contained in Clone ID NO:Z; or the polypeptide sequence encoded by a polynucleotide that hybridizes to the sequence of SEQ ID NO:X, the complement of the

sequence of SEQ ID NO:X, the complement of a portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, or the cDNA sequence contained in Clone ID NO:Z under stringent hybridization conditions or alternatively, under lower stringency hybridization as defined *supra*. The present invention further encompasses polynucleotide sequences encoding an epitope of a polypeptide sequence of the invention (such as, for example, the sequence disclosed in SEQ ID NO:X, or a fragment thereof), polynucleotide sequences of the complementary strand of a polynucleotide sequence encoding an epitope of the invention, and polynucleotide sequences which hybridize to the complementary strand under stringent hybridization conditions or alternatively, under lower stringency hybridization conditions defined *supra*.

[152] The term "epitopes," as used herein, refers to portions of a polypeptide having antigenic or immunogenic activity in an animal, preferably a mammal, and most preferably in a human. In a preferred embodiment, the present invention encompasses a polypeptide comprising an epitope, as well as the polynucleotide encoding this polypeptide. An "immunogenic epitope," as used herein, is defined as a portion of a protein that elicits an antibody response in an animal, as determined by any method known in the art, for example, by the methods for generating antibodies described *infra*. (See, for example, Geysen et al., Proc. Natl. Acad. Sci. USA 81:3998-4002 (1983)). The term "antigenic epitope," as used herein, is defined as a portion of a protein to which an antibody can immunospecifically bind its antigen as determined by any method well known in the art, for example, by the immunoassays described herein. Immunospecific binding excludes non-specific binding but does not necessarily exclude cross-reactivity with other antigens. Antigenic epitopes need not necessarily be immunogenic.

[153] Fragments which function as epitopes may be produced by any conventional means. (See, e.g., Houghten, R. A., Proc. Natl. Acad. Sci. USA 82:5131-5135 (1985) further described in U.S. Patent No. 4,631,211.)

[154] In the present invention, antigenic epitopes preferably contain a sequence of at least 4, at least 5, at least 6, at least 7, more preferably at least 8, at least 9, at least 10, at least 11, at least 12, at least 13, at least 14, at least 15, at least 20, at least 25, at least 30, at least 40, at least 50, and, most preferably, between about 15 to about 30 amino acids. Preferred polypeptides comprising immunogenic or antigenic epitopes are at least 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, or 100 amino acid residues in length. Additional non-exclusive preferred antigenic epitopes include the antigenic

epitopes disclosed herein, as well as portions thereof. Antigenic epitopes are useful, for example, to raise antibodies, including monoclonal antibodies, that specifically bind the epitope. Preferred antigenic epitopes include the antigenic epitopes disclosed herein, as well as any combination of two, three, four, five or more of these antigenic epitopes. Antigenic epitopes can be used as the target molecules in immunoassays. (See, for instance, Wilson et al., Cell 37:767-778 (1984); Sutcliffe et al., Science 219:660-666 (1983)).

[155] Non-limiting examples of epitopes of polypeptides that can be used to generate antibodies of the invention include a polypeptide comprising, or alternatively consisting of, at least one, two, three, four, five, six or more of the portion(s) of SEQ ID NO:Y specified in column 7 of Table 1A. These polypeptide fragments have been determined to bear antigenic epitopes of the proteins of the invention by the analysis of the Jameson-Wolf antigenic index which is included in the DNASTar suite of computer programs. By "comprise" it is intended that a polypeptide contains at least one, two, three, four, five, six or more of the portion(s) of SEQ ID NO:Y shown in column 7 of Table 1A, but it may contain additional flanking residues on either the amino or carboxyl termini of the recited portion. Such additional flanking sequences are preferably sequences naturally found adjacent to the portion; i.e., contiguous sequence shown in SEQ ID NO:Y. The flanking sequence may, however, be sequences from a heterologous polypeptide, such as from another protein described herein or from a heterologous polypeptide not described herein. In particular embodiments, epitope portions of a polypeptide of the invention comprise one, two, three, or more of the portions of SEQ ID NO:Y shown in column 7 of Table 1A.

[156] Similarly, immunogenic epitopes can be used, for example, to induce antibodies according to methods well known in the art. See, for instance, Sutcliffe et al., *supra*; Wilson et al., *supra*; Chow et al., Proc. Natl. Acad. Sci. USA 82:910-914; and Bittle et al., J. Gen. Virol. 66:2347-2354 (1985). Preferred immunogenic epitopes include the immunogenic epitopes disclosed herein, as well as any combination of two, three, four, five or more of these immunogenic epitopes. The polypeptides comprising one or more immunogenic epitopes may be presented for eliciting an antibody response together with a carrier protein, such as an albumin, to an animal system (such as rabbit or mouse), or, if the polypeptide is of sufficient length (at least about 25 amino acids), the polypeptide may be presented without a carrier. However, immunogenic epitopes comprising as few as 8 to 10 amino acids have been shown to be sufficient to raise antibodies capable of binding to, at the very least, linear epitopes in a denatured polypeptide (e.g., in Western blotting).

[157] Epitope-bearing polypeptides of the present invention may be used to induce antibodies according to methods well known in the art including, but not limited to, *in vivo* immunization, *in vitro* immunization, and phage display methods. See, e.g., Sutcliffe et al., *supra*; Wilson et al., *supra*, and Bittle et al., J. Gen. Virol., 66:2347-2354 (1985). If *in vivo* immunization is used, animals may be immunized with free peptide; however, anti-peptide antibody titer may be boosted by coupling the peptide to a macromolecular carrier, such as keyhole limpet hemacyanin (KLH) or tetanus toxoid. For instance, peptides containing cysteine residues may be coupled to a carrier using a linker such as maleimidobenzoyl- N-hydroxysuccinimide ester (MBS), while other peptides may be coupled to carriers using a more general linking agent such as glutaraldehyde. Animals such as rabbits, rats and mice are immunized with either free or carrier- coupled peptides, for instance, by intraperitoneal and/or intradermal injection of emulsions containing about 100 µg of peptide or carrier protein and Freund's adjuvant or any other adjuvant known for stimulating an immune response. Several booster injections may be needed, for instance, at intervals of about two weeks, to provide a useful titer of anti-peptide antibody which can be detected, for example, by ELISA assay using free peptide adsorbed to a solid surface. The titer of anti-peptide antibodies in serum from an immunized animal may be increased by selection of anti-peptide antibodies, for instance, by adsorption to the peptide on a solid support and elution of the selected antibodies according to methods well known in the art.

[158] As one of skill in the art will appreciate, and as discussed above, the polypeptides of the present invention (e.g., those comprising an immunogenic or antigenic epitope) can be fused to heterologous polypeptide sequences. For example, polypeptides of the present invention (including fragments or variants thereof), may be fused with the constant domain of immunoglobulins (IgA, IgE, IgG, IgM), or portions thereof (CH1, CH2, CH3, or any combination thereof and portions thereof, resulting in chimeric polypeptides. By way of another non-limiting example, polypeptides and/or antibodies of the present invention (including fragments or variants thereof) may be fused with albumin (including but not limited to recombinant human serum albumin or fragments or variants thereof (see, e.g., U.S. Patent No. 5,876,969, issued March 2, 1999, EP Patent 0 413 622, and U.S. Patent No. 5,766,883, issued June 16, 1998, herein incorporated by reference in their entirety)). In a preferred embodiment, polypeptides and/or antibodies of the present invention (including fragments or variants thereof) are fused with the mature form of human serum albumin (i.e.,

amino acids 1 – 585 of human serum albumin as shown in Figures 1 and 2 of EP Patent 0 322 094) which is herein incorporated by reference in its entirety. In another preferred embodiment, polypeptides and/or antibodies of the present invention (including fragments or variants thereof) are fused with polypeptide fragments comprising, or alternatively consisting of, amino acid residues 1-z of human serum albumin, where z is an integer from 369 to 419, as described in U.S. Patent 5,766,883 herein incorporated by reference in its entirety. Polypeptides and/or antibodies of the present invention (including fragments or variants thereof) may be fused to either the N- or C-terminal end of the heterologous protein (e.g., immunoglobulin Fc polypeptide or human serum albumin polypeptide). Polynucleotides encoding fusion proteins of the invention are also encompassed by the invention.

[159] Such fusion proteins as those described above may facilitate purification and may increase half-life *in vivo*. This has been shown for chimeric proteins consisting of the first two domains of the human CD4-polypeptide and various domains of the constant regions of the heavy or light chains of mammalian immunoglobulins. See, e.g., EP 394,827; Traunecker et al., *Nature*, 331:84-86 (1988). Enhanced delivery of an antigen across the epithelial barrier to the immune system has been demonstrated for antigens (e.g., insulin) conjugated to an FcRn binding partner such as IgG or Fc fragments (see, e.g., PCT Publications WO 96/22024 and WO 99/04813). IgG fusion proteins that have a disulfide-linked dimeric structure due to the IgG portion disulfide bonds have also been found to be more efficient in binding and neutralizing other molecules than monomeric polypeptides or fragments thereof alone. See, e.g., Fountoulakis et al., *J. Biochem.*, 270:3958-3964 (1995). Nucleic acids encoding the above epitopes can also be recombined with a gene of interest as an epitope tag (e.g., the hemagglutinin (HA) tag or flag tag) to aid in detection and purification of the expressed polypeptide. For example, a system described by Janknecht et al. allows for the ready purification of non-denatured fusion proteins expressed in human cell lines (Janknecht et al., 1991, *Proc. Natl. Acad. Sci. USA* 88:8972-897). In this system, the gene of interest is subcloned into a vaccinia recombination plasmid such that the open reading frame of the gene is translationally fused to an amino-terminal tag consisting of six histidine residues. The tag serves as a matrix binding domain for the fusion protein. Extracts from cells infected with the recombinant vaccinia virus are loaded onto Ni²⁺ nitriloacetic acid-agarose column and histidine-tagged proteins can be selectively eluted with imidazole-containing buffers.

Fusion Proteins

[160] Any polypeptide of the present invention can be used to generate fusion proteins. For example, the polypeptide of the present invention, when fused to a second protein, can be used as an antigenic tag. Antibodies raised against the polypeptide of the present invention can be used to indirectly detect the second protein by binding to the polypeptide. Moreover, because secreted proteins target cellular locations based on trafficking signals, polypeptides of the present invention which are shown to be secreted can be used as targeting molecules once fused to other proteins.

[161] Examples of domains that can be fused to polypeptides of the present invention include *not only heterologous signal sequences, but also other heterologous functional regions*. The fusion does not necessarily need to be direct, but may occur through linker sequences.

[162] In certain preferred embodiments, proteins of the invention are fusion proteins comprising an amino acid sequence that is an N and/or C- terminal deletion of a polypeptide of the invention. In preferred embodiments, the invention is directed to a fusion protein comprising an amino acid sequence that is at least 90%, 95%, 96%, 97%, 98% or 99% identical to a polypeptide sequence of the invention. Polynucleotides encoding these proteins are also encompassed by the invention.

[163] Moreover, fusion proteins may also be engineered to improve characteristics of the polypeptide of the present invention. For instance, a region of additional amino acids, particularly charged amino acids, may be added to the N-terminus of the polypeptide to improve stability and persistence during purification from the host cell or subsequent handling and storage. Also, peptide moieties may be added to the polypeptide to facilitate purification. Such regions may be removed prior to final preparation of the polypeptide. The addition of peptide moieties to facilitate handling of polypeptides are familiar and routine techniques in the art.

[164] As one of skill in the art will appreciate that, as discussed above, polypeptides of the present invention, and epitope-bearing fragments thereof, can be combined with heterologous polypeptide sequences. For example, the polypeptides of the present invention may be fused with heterologous polypeptide sequences, for example, the polypeptides of the present invention may be fused with the constant domain of immunoglobulins (IgA, IgE, IgG, IgM) or portions thereof (CH1, CH2, CH3, and any

combination thereof, including both entire domains and portions thereof), or albumin (including, but not limited to, native or recombinant human albumin or fragments or variants thereof (see, e.g., U.S. Patent No. 5,876,969, issued March 2, 1999, EP Patent 0 413 622, and U.S. Patent No. 5,766,883, issued June 16, 1998, herein incorporated by reference in their entirety)), resulting in chimeric polypeptides. For example, EP-A-O 464 533 (Canadian counterpart 2045869) discloses fusion proteins comprising various portions of constant region of immunoglobulin molecules together with another human protein or part thereof. In many cases, the Fc part in a fusion protein is beneficial in therapy and diagnosis, and thus can result in, for example, improved pharmacokinetic properties (EP-A 0232 262). Alternatively, deleting the Fc part after the fusion protein has been expressed, detected, and purified, would be desired. For example, the Fc portion may hinder therapy and diagnosis if the fusion protein is used as an antigen for immunizations. In drug discovery, for example, human proteins, such as hIL-5, have been fused with Fc portions for the purpose of high-throughput screening assays to identify antagonists of hIL-5. See, D. Bennett et al., *J. Molecular Recognition* 8:52-58 (1995); K. Johanson et al., *J. Biol. Chem.* 270:9459-9471 (1995).

[165] Moreover, the polypeptides of the present invention can be fused to marker sequences, such as a polypeptide which facilitates purification of the fused polypeptide. In preferred embodiments, the marker amino acid sequence is a hexa-histidine peptide, such as the tag provided in a pQE vector (QIAGEN, Inc., 9259 Eton Avenue, Chatsworth, CA, 91311), among others, many of which are commercially available. As described in Gentz et al., *Proc. Natl. Acad. Sci. USA* 86:821-824 (1989), for instance, hexa-histidine provides for convenient purification of the fusion protein. Another peptide tag useful for purification, the "HA" tag, corresponds to an epitope derived from the influenza hemagglutinin protein (Wilson et al., *Cell* 37:767 (1984)).

[166] Additional fusion proteins of the invention may be generated through the techniques of gene-shuffling, motif-shuffling, exon-shuffling, and/or codon-shuffling (collectively referred to as "DNA shuffling"). DNA shuffling may be employed to modulate the activities of polypeptides of the invention, such methods can be used to generate polypeptides with altered activity, as well as agonists and antagonists of the polypeptides. See, generally, U.S. Patent Nos. 5,605,793; 5,811,238; 5,830,721; 5,834,252; and 5,837,458, and Patten et al., *Curr. Opinion Biotechnol.* 8:724-33 (1997); Harayama, *Trends Biotechnol.* 16(2):76-82 (1998); Hansson, et al., *J. Mol. Biol.* 287:265-76 (1999);

and Lorenzo and Blasco, *Biotechniques* 24(2):308- 13 (1998) (each of these patents and publications are hereby incorporated by reference in its entirety). In one embodiment, alteration of polynucleotides corresponding to SEQ ID NO:X and the polypeptides encoded by these polynucleotides may be achieved by DNA shuffling. DNA shuffling involves the assembly of two or more DNA segments by homologous or site-specific recombination to generate variation in the polynucleotide sequence. In another embodiment, polynucleotides of the invention, or the encoded polypeptides, may be altered by being subjected to random mutagenesis by error-prone PCR, random nucleotide insertion or other methods prior to recombination. In another embodiment, one or more components, motifs, sections, parts, domains, fragments, etc., of a polynucleotide encoding a polypeptide of the invention may be recombined with one or more components, motifs, sections, parts, domains, fragments, etc. of one or more heterologous molecules.

[167] Thus, any of these above fusions can be engineered using the polynucleotides or the polypeptides of the present invention.

Recombinant and Synthetic Production of Polypeptides of the Invention

[168] The present invention also relates to vectors containing the polynucleotide of the present invention, host cells, and the production of polypeptides by synthetic and recombinant techniques. The vector may be, for example, a phage, plasmid, viral, or retroviral vector. Retroviral vectors may be replication competent or replication defective. In the latter case, viral propagation generally will occur only in complementing host cells.

[169] The polynucleotides of the invention may be joined to a vector containing a selectable marker for propagation in a host. Generally, a plasmid vector is introduced in a precipitate, such as a calcium phosphate precipitate, or in a complex with a charged lipid. If the vector is a virus, it may be packaged in vitro using an appropriate packaging cell line and then transduced into host cells.

[170] The polynucleotide insert should be operatively linked to an appropriate promoter, such as the phage lambda PL promoter, the *E. coli* lac, trp, phoA and tac promoters, the SV40 early and late promoters and promoters of retroviral LTRs, to name a few. Other suitable promoters will be known to the skilled artisan. The expression constructs will further contain sites for transcription initiation, termination, and, in the transcribed region, a ribosome binding site for translation. The coding portion of the transcripts expressed by the constructs will preferably include a translation initiating codon

at the beginning and a termination codon (UAA, UGA or UAG) appropriately positioned at the end of the polypeptide to be translated.

[171] As indicated, the expression vectors will preferably include at least one selectable marker. Such markers include dihydrofolate reductase, G418, glutamine synthase, or neomycin resistance for eukaryotic cell culture, and tetracycline, kanamycin or ampicillin resistance genes for culturing in *E. coli* and other bacteria. Representative examples of appropriate hosts include, but are not limited to, bacterial cells, such as *E. coli*, *Streptomyces* and *Salmonella typhimurium* cells; fungal cells, such as yeast cells (e.g., *Saccharomyces cerevisiae* or *Pichia pastoris* (ATCC Accession No. 201178)); insect cells such as *Drosophila* S2 and *Spodoptera Sf9* cells; animal cells such as CHO, COS, 293, and Bowes melanoma cells; and plant cells. Appropriate culture mediums and conditions for the above-described host cells are known in the art.

[172] Among vectors preferred for use in bacteria include pQE70, pQE60 and pQE-9, available from QIAGEN, Inc.; pBluescript vectors, Phagescript vectors, pNH8A, pNH16a, pNH18A, pNH46A, available from Stratagene Cloning Systems, Inc.; and ptrc99a, pKK223-3, pKK233-3, pDR540, pRIT5 available from Pharmacia Biotech, Inc. Among preferred eukaryotic vectors are pWLNEO, pSV2CAT, pOG44, pXT1 and pSG available from Stratagene; and pSVK3, pBPV, pMSG and pSVL available from Pharmacia. Preferred expression vectors for use in yeast systems include, but are not limited to pYES2, pYD1, pTEF1/Zeo, pYES2/GS, pPICZ, pGAPZ, pGAPZalph, pPIC9, pPIC3.5, pHIL-D2, pHIL-S1, pPIC3.5K, pPIC9K, and PAO815 (all available from Invitrogen, Carlsbad, CA). Other suitable vectors will be readily apparent to the skilled artisan.

[173] Vectors which use glutamine synthase (GS) or DHFR as the selectable markers can be amplified in the presence of the drugs methionine sulfoximine or methotrexate, respectively. An advantage of glutamine synthase based vectors are the availability of cell lines (e.g., the murine myeloma cell line, NS0) which are glutamine synthase negative. Glutamine synthase expression systems can also function in glutamine synthase expressing cells (e.g., Chinese Hamster Ovary (CHO) cells) by providing additional inhibitor to prevent the functioning of the endogenous gene. A glutamine synthase expression system and components thereof are detailed in PCT publications: WO87/04462; WO86/05807; WO89/01036; WO89/10404; and WO91/06657, which are hereby incorporated in their entireties by reference herein. Additionally, glutamine synthase expression vectors can be obtained from Lonza Biologics, Inc. (Portsmouth, NH). Expression and production of

monoclonal antibodies using a GS expression system in murine myeloma cells is described in Bebbington *et al.*, *Bio/technology* 10:169(1992) and in Biblia and Robinson *Biotechnol. Prog.* 11:1 (1995) which are herein incorporated by reference.

[174] The present invention also relates to host cells containing the above-described vector constructs described herein, and additionally encompasses host cells containing nucleotide sequences of the invention that are operably associated with one or more heterologous control regions (e.g., promoter and/or enhancer) using techniques known of in the art. The host cell can be a higher eukaryotic cell, such as a mammalian cell (e.g., a human derived cell), or a lower eukaryotic cell, such as a yeast cell, or the host cell can be a prokaryotic cell, such as a bacterial cell. A host strain may be chosen which modulates the expression of the inserted gene sequences, or modifies and processes the gene product in the specific fashion desired. Expression from certain promoters can be elevated in the presence of certain inducers; thus expression of the genetically engineered polypeptide may be controlled. Furthermore, different host cells have characteristics and specific mechanisms for the translational and post-translational processing and modification (e.g., phosphorylation, cleavage) of proteins. Appropriate cell lines can be chosen to ensure the desired modifications and processing of the foreign protein expressed.

[175] Introduction of the nucleic acids and nucleic acid constructs of the invention into the host cell can be effected by calcium phosphate transfection, DEAE-dextran mediated transfection, cationic lipid-mediated transfection, electroporation, transduction, infection, or other methods. Such methods are described in many standard laboratory manuals, such as Davis *et al.*, *Basic Methods In Molecular Biology* (1986). It is specifically contemplated that the polypeptides of the present invention may in fact be expressed by a host cell lacking a recombinant vector.

[176] In addition to encompassing host cells containing the vector constructs discussed herein, the invention also encompasses primary, secondary, and immortalized host cells of vertebrate origin, particularly mammalian origin, that have been engineered to delete or replace endogenous genetic material (e.g., the coding sequence), and/or to include genetic material (e.g., heterologous polynucleotide sequences) that is operably associated with polynucleotides of the invention, and which activates, alters, and/or amplifies endogenous polynucleotides. For example, techniques known in the art may be used to operably associate heterologous control regions (e.g., promoter and/or enhancer) and endogenous polynucleotide sequences via homologous recombination (see, e.g., US Patent Number

5,641,670, issued June 24, 1997; International Publication Number WO 96/29411; International Publication Number WO 94/12650; Koller *et al.*, *Proc. Natl. Acad. Sci. USA* 86:8932-8935 (1989); and Zijlstra *et al.*, *Nature* 342:435-438 (1989), the disclosures of each of which are incorporated by reference in their entireties).

[177] Polypeptides of the invention can be recovered and purified from recombinant cell cultures by well-known methods including ammonium sulfate or ethanol precipitation, acid extraction, anion or cation exchange chromatography, phosphocellulose chromatography, hydrophobic interaction chromatography, affinity chromatography, hydroxylapatite chromatography and lectin chromatography. Most preferably, high performance liquid chromatography ("HPLC") is employed for purification.

[178] Polypeptides of the present invention can also be recovered from: products purified from natural sources, including bodily fluids, tissues and cells, whether directly isolated or cultured; products of chemical synthetic procedures; and products produced by recombinant techniques from a prokaryotic or eukaryotic host, including, for example, bacterial, yeast, higher plant, insect, and mammalian cells. Depending upon the host employed in a recombinant production procedure, the polypeptides of the present invention may be glycosylated or may be non-glycosylated. In addition, polypeptides of the invention may also include an initial modified methionine residue, in some cases as a result of host-mediated processes. Thus, it is well known in the art that the N-terminal methionine encoded by the translation initiation codon generally is removed with high efficiency from any protein after translation in all eukaryotic cells. While the N-terminal methionine on most proteins also is efficiently removed in most prokaryotes, for some proteins, this prokaryotic removal process is inefficient, depending on the nature of the amino acid to which the N-terminal methionine is covalently linked.

[179] In one embodiment, the yeast *Pichia pastoris* is used to express polypeptides of the invention in a eukaryotic system. *Pichia pastoris* is a methylotrophic yeast which can metabolize methanol as its sole carbon source. A main step in the methanol metabolism pathway is the oxidation of methanol to formaldehyde using O₂. This reaction is catalyzed by the enzyme alcohol oxidase. In order to metabolize methanol as its sole carbon source, *Pichia pastoris* must generate high levels of alcohol oxidase due, in part, to the relatively low affinity of alcohol oxidase for O₂. Consequently, in a growth medium depending on methanol as a main carbon source, the promoter region of one of the two alcohol oxidase

genes (*AOX1*) is highly active. In the presence of methanol, alcohol oxidase produced from the *AOX1* gene comprises up to approximately 30% of the total soluble protein in *Pichia pastoris*. See Ellis, S.B., *et al.*, *Mol. Cell. Biol.* 5:1111-21 (1985); Koutz, P.J., *et al.*, *Yeast* 5:167-77 (1989); Tschopp, J.F., *et al.*, *Nucl. Acids Res.* 15:3859-76 (1987). Thus, a heterologous coding sequence, such as, for example, a polynucleotide of the present invention, under the transcriptional regulation of all or part of the *AOX1* regulatory sequence is expressed at exceptionally high levels in *Pichia* yeast grown in the presence of methanol.

[180] In one example, the plasmid vector pPIC9K is used to express DNA encoding a polypeptide of the invention, as set forth herein, in a *Pichea* yeast system essentially as described in "*Pichia* Protocols: Methods in Molecular Biology," D.R. Higgins and J. Cregg, eds. The Humana Press, Totowa, NJ, 1998. This expression vector allows expression and secretion of a polypeptide of the invention by virtue of the strong *AOX1* promoter linked to the *Pichia pastoris* alkaline phosphatase (PHO) secretory signal peptide (i.e., leader) located upstream of a multiple cloning site.

[181] Many other yeast vectors could be used in place of pPIC9K, such as, pYES2, pYD1, pTEF1/Zeo, pYES2/GS, pPICZ, pGAPZ, pGAPZalpha, pPIC9, pPIC3.5, pHIL-D2, pHIL-S1, pPIC3.5K, and PAO815, as one skilled in the art would readily appreciate, as long as the proposed expression construct provides appropriately located signals for transcription, translation, secretion (if desired), and the like, including an in-frame AUG as required.

[182] In another embodiment, high-level expression of a heterologous coding sequence, such as, for example, a polynucleotide of the present invention, may be achieved by cloning the heterologous polynucleotide of the invention into an expression vector such as, for example, pGAPZ or pGAPZalpha, and growing the yeast culture in the absence of methanol.

[183] In addition to encompassing host cells containing the vector constructs discussed herein, the invention also encompasses primary, secondary, and immortalized host cells of vertebrate origin, particularly mammalian origin, that have been engineered to delete or replace endogenous genetic material (e.g., coding sequence), and/or to include genetic material (e.g., heterologous polynucleotide sequences) that is operably associated with

polynucleotides of the invention, and which activates, alters, and/or amplifies endogenous polynucleotides. For example, techniques known in the art may be used to operably associate heterologous control regions (e.g., promoter and/or enhancer) and endogenous polynucleotide sequences via homologous recombination (see, e.g., U.S. Patent No. 5,641,670, issued June 24, 1997; International Publication No. WO 96/29411, published September 26, 1996; International Publication No. WO 94/12650, published August 4, 1994; Koller et al., Proc. Natl. Acad. Sci. USA 86:8932-8935 (1989); and Zijlstra et al., Nature 342:435-438 (1989), the disclosures of each of which are incorporated by reference in their entireties).

[184] In addition, polypeptides of the invention can be chemically synthesized using techniques known in the art (e.g., see Creighton, 1983, *Proteins: Structures and Molecular Principles*, W.H. Freeman & Co., N.Y., and Hunkapiller et al., *Nature*, 310:105-111 (1984)). For example, a polypeptide corresponding to a fragment of a polypeptide can be synthesized by use of a peptide synthesizer. Furthermore, if desired, nonclassical amino acids or chemical amino acid analogs can be introduced as a substitution or addition into the polypeptide sequence. Non-classical amino acids include, but are not limited to, to the D-isomers of the common amino acids, 2,4-diaminobutyric acid, α -amino isobutyric acid, 4-aminobutyric acid, Abu, 2-amino butyric acid, γ -Abu, ϵ -Ahx, 6-amino hexanoic acid, Aib, 2-amino isobutyric acid, 3-amino propionic acid, ornithine, norleucine, norvaline, hydroxyproline, sarcosine, citrulline, homocitrulline, cysteic acid, t-butylglycine, t-butylalanine, phenylglycine, cyclohexylalanine, β -alanine, fluoro-amino acids, designer amino acids such as β -methyl amino acids, Ca-methyl amino acids, Na-methyl amino acids, and amino acid analogs in general. Furthermore, the amino acid can be D (dextrorotary) or L (levorotary).

[185] The invention encompasses polypeptides of the present invention which are differentially modified during or after translation, e.g., by glycosylation, acetylation, phosphorylation, amidation, derivatization by known protecting/blocking groups, proteolytic cleavage, linkage to an antibody molecule or other cellular ligand, etc. Any of numerous chemical modifications may be carried out by known techniques, including but not limited, to specific chemical cleavage by cyanogen bromide, trypsin, chymotrypsin, papain, V8 protease, NaBH_4 ; acetylation, formylation, oxidation, reduction; metabolic synthesis in the presence of tunicamycin; etc.

[186] Additional post-translational modifications encompassed by the invention include, for example, e.g., N-linked or O-linked carbohydrate chains, processing of N-terminal or C-terminal ends), attachment of chemical moieties to the amino acid backbone, chemical modifications of N-linked or O-linked carbohydrate chains, and addition or deletion of an N-terminal methionine residue as a result of procaryotic host cell expression. The polypeptides may also be modified with a detectable label, such as an enzymatic, fluorescent, isotopic or affinity label to allow for detection and isolation of the protein.

[187] Examples of suitable enzymes include horseradish peroxidase, alkaline phosphatase, beta-galactosidase, or acetylcholinesterase; examples of suitable prosthetic group complexes include streptavidin/biotin and avidin/biotin; examples of suitable fluorescent materials include umbelliferone, fluorescein, fluorescein isothiocyanate, rhodamine, dichlorotriazinylamine fluorescein, dansyl chloride or phycoerythrin; an example of a luminescent material includes luminol; examples of bioluminescent materials include luciferase, luciferin, and aequorin; and examples of suitable radioactive material include iodine (^{121}I , ^{123}I , ^{125}I , ^{131}I), carbon (^{14}C), sulfur (^{35}S), tritium (^3H), indium (^{111}In , ^{112}In , $^{113\text{m}}\text{In}$, $^{115\text{m}}\text{In}$), technetium (^{99}Tc , $^{99\text{m}}\text{Tc}$), thallium (^{201}Tl), gallium (^{68}Ga , ^{67}Ga), palladium (^{103}Pd), molybdenum (^{99}Mo), xenon (^{133}Xe), fluorine (^{18}F), ^{153}Sm , ^{177}Lu , ^{159}Gd , ^{149}Pm , ^{140}La , ^{175}Yb , ^{166}Ho , ^{90}Y , ^{47}Sc , ^{186}Re , ^{188}Re , ^{142}Pr , ^{105}Rh , and ^{97}Ru .

[188] In specific embodiments, a polypeptide of the present invention or fragment or variant thereof is attached to macrocyclic chelators that associate with radiometal ions, including but not limited to, ^{177}Lu , ^{90}Y , ^{166}Ho , and ^{153}Sm , to polypeptides. In a preferred embodiment, the radiometal ion associated with the macrocyclic chelators is ^{111}In . In another preferred embodiment, the radiometal ion associated with the macrocyclic chelator is ^{90}Y . In specific embodiments, the macrocyclic chelator is 1,4,7,10-tetraazacyclododecane-N,N',N'',N'''-tetraacetic acid (DOTA). In other specific embodiments, DOTA is attached to an antibody of the invention or fragment thereof via a linker molecule. Examples of linker molecules useful for conjugating DOTA to a polypeptide are commonly known in the art - see, for example, DeNardo et al., Clin Cancer Res. 4(10):2483-90 (1998); Peterson et al., Bioconjug. Chem. 10(4):553-7 (1999); and Zimmerman et al, Nucl. Med. Biol. 26(8):943-50 (1999); which are hereby incorporated by reference in their entirety.

[189] As mentioned, the proteins of the invention may be modified by either natural

processes, such as posttranslational processing, or by chemical modification techniques which are well known in the art. It will be appreciated that the same type of modification may be present in the same or varying degrees at several sites in a given polypeptide. Polypeptides of the invention may be branched, for example, as a result of ubiquitination, and they may be cyclic, with or without branching. Cyclic, branched, and branched cyclic polypeptides may result from posttranslation natural processes or may be made by synthetic methods. Modifications include acetylation, acylation, ADP-ribosylation, amidation, covalent attachment of flavin, covalent attachment of a heme moiety, covalent attachment of a nucleotide or nucleotide derivative, covalent attachment of a lipid or lipid derivative, covalent attachment of phosphatidylinositol, cross-linking, cyclization, disulfide bond formation, demethylation, formation of covalent cross-links, formation of cysteine, formation of pyroglutamate, formylation, gamma-carboxylation, glycosylation, GPI anchor formation, hydroxylation, iodination, methylation, myristoylation, oxidation, pegylation, proteolytic processing, phosphorylation, prenylation, racemization, selenoylation, sulfation, transfer-RNA mediated addition of amino acids to proteins such as arginylation, and ubiquitination. (See, for instance, PROTEINS - STRUCTURE AND MOLECULAR PROPERTIES, 2nd Ed., T. E. Creighton, W. H. Freeman and Company, New York (1993); POSTTRANSLATIONAL COVALENT MODIFICATION OF PROTEINS, B. C. Johnson, Ed., Academic Press, New York, pgs. 1-12 (1983); Seifter et al., Meth. Enzymol. 182:626-646 (1990); Rattan et al., Ann. N.Y. Acad. Sci. 663:48-62 (1992)).

[190] Also provided by the invention are chemically modified derivatives of the polypeptides of the invention which may provide additional advantages such as increased solubility, stability and circulating time of the polypeptide, or decreased immunogenicity (see U.S. Patent No. 4,179,337). The chemical moieties for derivitization may be selected from water soluble polymers such as polyethylene glycol, ethylene glycol/propylene glycol copolymers, carboxymethylcellulose, dextran, polyvinyl alcohol and the like. The polypeptides may be modified at random positions within the molecule, or at predetermined positions within the molecule and may include one, two, three or more attached chemical moieties.

[191] The polymer may be of any molecular weight, and may be branched or unbranched. For polyethylene glycol, the preferred molecular weight is between about 1 kDa and about 100 kDa (the term "about" indicating that in preparations of polyethylene glycol, some molecules will weigh more, some less, than the stated molecular weight) for

ease in handling and manufacturing. Other sizes may be used, depending on the desired therapeutic profile (e.g., the duration of sustained release desired, the effects, if any on biological activity, the ease in handling, the degree or lack of antigenicity and other known effects of the polyethylene glycol to a therapeutic protein or analog). For example, the polyethylene glycol may have an average molecular weight of about 200, 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 5500, 6000, 6500, 7000, 7500, 8000, 8500, 9000, 9500, 10,000, 10,500, 11,000, 11,500, 12,000, 12,500, 13,000, 13,500, 14,000, 14,500, 15,000, 15,500, 16,000, 16,500, 17,000, 17,500, 18,000, 18,500, 19,000, 19,500, 20,000, 25,000, 30,000, 35,000, 40,000, 45,000, 50,000, 55,000, 60,000, 65,000, 70,000, 75,000, 80,000, 85,000, 90,000, 95,000, or 100,000 kDa.

[192] As noted above, the polyethylene glycol may have a branched structure. Branched polyethylene glycols are described, for example, in U.S. Patent No. 5,643,575; Morpurgo *et al.*, *Appl. Biochem. Biotechnol.* 56:59-72 (1996); Vorobjev *et al.*, *Nucleosides Nucleotides* 18:2745-2750 (1999); and Caliceti *et al.*, *Bioconjug. Chem.* 10:638-646 (1999), the disclosures of each of which are incorporated herein by reference.

[193] The polyethylene glycol molecules (or other chemical moieties) should be attached to the protein with consideration of effects on functional or antigenic domains of the protein. There are a number of attachment methods available to those skilled in the art, such as, for example, the method disclosed in EP 0 401 384 (coupling PEG to G-CSF), herein incorporated by reference; see also Malik *et al.*, *Exp. Hematol.* 20:1028-1035 (1992), reporting pegylation of GM-CSF using tresyl chloride. For example, polyethylene glycol may be covalently bound through amino acid residues via a reactive group, such as a free amino or carboxyl group. Reactive groups are those to which an activated polyethylene glycol molecule may be bound. The amino acid residues having a free amino group may include lysine residues and the N-terminal amino acid residues; those having a free carboxyl group may include aspartic acid residues glutamic acid residues and the C-terminal amino acid residue. Sulfhydryl groups may also be used as a reactive group for attaching the polyethylene glycol molecules. Preferred for therapeutic purposes is attachment at an amino group, such as attachment at the N-terminus or lysine group.

[194] As suggested above, polyethylene glycol may be attached to proteins via linkage to any of a number of amino acid residues. For example, polyethylene glycol can be linked to proteins via covalent bonds to lysine, histidine, aspartic acid, glutamic acid, or cysteine residues. One or more reaction chemistries may be employed to attach polyethylene glycol

to specific amino acid residues (e.g., lysine, histidine, aspartic acid, glutamic acid, or cysteine) of the protein or to more than one type of amino acid residue (e.g., lysine, histidine, aspartic acid, glutamic acid, cysteine and combinations thereof) of the protein.

[195] One may specifically desire proteins chemically modified at the N-terminus. Using polyethylene glycol as an illustration of the present composition, one may select from a variety of polyethylene glycol molecules (by molecular weight, branching, etc.), the proportion of polyethylene glycol molecules to protein (polypeptide) molecules in the reaction mix, the type of pegylation reaction to be performed, and the method of obtaining the selected N-terminally pegylated protein. The method of obtaining the N-terminally pegylated preparation (i.e., separating this moiety from other monopegylated moieties if necessary) may be by purification of the N-terminally pegylated material from a population of pegylated protein molecules. Selective proteins chemically modified at the N-terminus modification may be accomplished by reductive alkylation which exploits differential reactivity of different types of primary amino groups (lysine versus the N-terminal) available for derivatization in a particular protein. Under the appropriate reaction conditions, substantially selective derivatization of the protein at the N-terminus with a carbonyl group containing polymer is achieved.

[196] As indicated above, pegylation of the proteins of the invention may be accomplished by any number of means. For example, polyethylene glycol may be attached to the protein either directly or by an intervening linker. Linkerless systems for attaching polyethylene glycol to proteins are described in Delgado et al., *Crit. Rev. Thera. Drug Carrier Sys.* 9:249-304 (1992); Francis et al., *Intern. J. of Hematol.* 68:1-18 (1998); U.S. Patent No. 4,002,531; U.S. Patent No. 5,349,052; WO 95/06058; and WO 98/32466, the disclosures of each of which are incorporated herein by reference.

[197] One system for attaching polyethylene glycol directly to amino acid residues of proteins without an intervening linker employs tresylated MPEG, which is produced by the modification of monmethoxy polyethylene glycol (MPEG) using tresylchloride ($\text{ClSO}_2\text{CH}_2\text{CF}_3$). Upon reaction of protein with tresylated MPEG, polyethylene glycol is directly attached to amine groups of the protein. Thus, the invention includes protein-polyethylene glycol conjugates produced by reacting proteins of the invention with a polyethylene glycol molecule having a 2,2,2-trifluoroethane sulphonyl group.

[198] Polyethylene glycol can also be attached to proteins using a number of different intervening linkers. For example, U.S. Patent No. 5,612,460, the entire disclosure of which

is incorporated herein by reference, discloses urethane linkers for connecting polyethylene glycol to proteins. Protein-polyethylene glycol conjugates wherein the polyethylene glycol is attached to the protein by a linker can also be produced by reaction of proteins with compounds such as MPEG-succinimidylsuccinate, MPEG activated with 1,1'-carbonyldiimidazole, MPEG-2,4,5-trichloropenylcarbonate, MPEG-p-nitrophenolcarbonate, and various MPEG-succinate derivatives. A number of additional polyethylene glycol derivatives and reaction chemistries for attaching polyethylene glycol to proteins are described in International Publication No. WO 98/32466, the entire disclosure of which is incorporated herein by reference. Pegylated protein products produced using the reaction chemistries set out herein are included within the scope of the invention.

[199] The number of polyethylene glycol moieties attached to each protein of the invention (i.e., the degree of substitution) may also vary. For example, the pegylated proteins of the invention may be linked, on average, to 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 17, 20, or more polyethylene glycol molecules. Similarly, the average degree of substitution within ranges such as 1-3, 2-4, 3-5, 4-6, 5-7, 6-8, 7-9, 8-10, 9-11, 10-12, 11-13, 12-14, 13-15, 14-16, 15-17, 16-18, 17-19, or 18-20 polyethylene glycol moieties per protein molecule. Methods for determining the degree of substitution are discussed, for example, in Delgado et al., Crit. Rev. Thera. Drug Carrier Sys. 9:249-304 (1992).

[200] The polypeptides of the invention can be recovered and purified from chemical synthesis and recombinant cell cultures by standard methods which include, but are not limited to, ammonium sulfate or ethanol precipitation, acid extraction, anion or cation exchange chromatography, phosphocellulose chromatography, hydrophobic interaction chromatography, affinity chromatography, hydroxylapatite chromatography and lectin chromatography. Most preferably, high performance liquid chromatography ("HPLC") is employed for purification. Well known techniques for refolding protein may be employed to regenerate active conformation when the polypeptide is denatured during isolation and/or purification.

[201] The polypeptides of the invention may be in monomers or multimers (i.e., dimers, trimers, tetramers and higher multimers). Accordingly, the present invention relates to monomers and multimers of the polypeptides of the invention, their preparation, and compositions (preferably, Therapeutics) containing them. In specific embodiments, the polypeptides of the invention are monomers, dimers, trimers or tetramers. In additional

embodiments, the multimers of the invention are at least dimers, at least trimers, or at least tetramers.

[202] Multimers encompassed by the invention may be homomers or heteromers. As used herein, the term homomer refers to a multimer containing only polypeptides corresponding to a protein of the invention (e.g., the amino acid sequence of SEQ ID NO:Y, an amino acid sequence encoded by SEQ ID NO:X or the complement of SEQ ID NO:X, the amino acid sequence encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, and/or an amino acid sequence encoded by cDNA contained in Clone ID NO:Z (including fragments, variants, splice variants, and fusion proteins, corresponding to these as described herein)). These homomers may contain polypeptides having identical or different amino acid sequences. In a specific embodiment, a homomer of the invention is a multimer containing only polypeptides having an identical amino acid sequence. In another specific embodiment, a homomer of the invention is a multimer containing polypeptides having different amino acid sequences. In specific embodiments, the multimer of the invention is a homodimer (e.g., containing two polypeptides having identical or different amino acid sequences) or a homotrimer (e.g., containing three polypeptides having identical and/or different amino acid sequences). In additional embodiments, the homomeric multimer of the invention is at least a homodimer, at least a homotrimer, or at least a homotetramer.

[203] As used herein, the term heteromer refers to a multimer containing one or more heterologous polypeptides (i.e., polypeptides of different proteins) in addition to the polypeptides of the invention. In a specific embodiment, the multimer of the invention is a heterodimer, a heterotrimer, or a heterotetramer. In additional embodiments, the heteromeric multimer of the invention is at least a heterodimer, at least a heterotrimer, or at least a heterotetramer.

[204] Multimers of the invention may be the result of hydrophobic, hydrophilic, ionic and/or covalent associations and/or may be indirectly linked by, for example, liposome formation. Thus, in one embodiment, multimers of the invention, such as, for example, homodimers or homotrimers, are formed when polypeptides of the invention contact one another in solution. In another embodiment, heteromultimers of the invention, such as, for example, heterotrimers or heterotetramers, are formed when polypeptides of the invention contact antibodies to the polypeptides of the invention (including antibodies to the heterologous polypeptide sequence in a fusion protein of the invention) in solution. In other

embodiments, multimers of the invention are formed by covalent associations with and/or between the polypeptides of the invention. Such covalent associations may involve one or more amino acid residues contained in the polypeptide sequence (e.g., that recited in SEQ ID NO:Y, encoded by the portion of SEQ ID NO:X as defined in columns 8 and 9 of Table 2, and/or encoded by the cDNA contained in Clone ID NO:Z). In one instance, the covalent associations are cross-linking between cysteine residues located within the polypeptide sequences which interact in the native (i.e., naturally occurring) polypeptide. In another instance, the covalent associations are the consequence of chemical or recombinant manipulation. Alternatively, such covalent associations may involve one or more amino acid residues contained in the heterologous polypeptide sequence in a fusion protein. In one example, covalent associations are between the heterologous sequence contained in a fusion protein of the invention (see, e.g., US Patent Number 5,478,925). In a specific example, the covalent associations are between the heterologous sequence contained in a Fc fusion protein of the invention (as described herein). In another specific example, covalent associations of fusion proteins of the invention are between heterologous polypeptide sequence from another protein that is capable of forming covalently associated multimers, such as for example, osteoprotegerin (see, e.g., International Publication NO: WO 98/49305, the contents of which are herein incorporated by reference in its entirety). In another embodiment, two or more polypeptides of the invention are joined through peptide linkers. Examples include those peptide linkers described in U.S. Pat. No. 5,073,627 (hereby incorporated by reference). Proteins comprising multiple polypeptides of the invention separated by peptide linkers may be produced using conventional recombinant DNA technology.

[205] Another method for preparing multimer polypeptides of the invention involves use of polypeptides of the invention fused to a leucine zipper or isoleucine zipper polypeptide sequence. Leucine zipper and isoleucine zipper domains are polypeptides that promote multimerization of the proteins in which they are found. Leucine zippers were originally identified in several DNA-binding proteins (Landschulz et al., Science 240:1759, (1988)), and have since been found in a variety of different proteins. Among the known leucine zippers are naturally occurring peptides and derivatives thereof that dimerize or trimerize. Examples of leucine zipper domains suitable for producing soluble multimeric proteins of the invention are those described in PCT application WO 94/10308, hereby incorporated by reference. Recombinant fusion proteins comprising a polypeptide of the

invention fused to a polypeptide sequence that dimerizes or trimerizes in solution are expressed in suitable host cells, and the resulting soluble multimeric fusion protein is recovered from the culture supernatant using techniques known in the art.

[206] Trimeric polypeptides of the invention may offer the advantage of enhanced biological activity. Preferred leucine zipper moieties and isoleucine moieties are those that preferentially form trimers. One example is a leucine zipper derived from lung surfactant protein D (SPD), as described in Hoppe et al. (FEBS Letters 344:191, (1994)) and in U.S. patent application Ser. No. 08/446,922, hereby incorporated by reference. Other peptides derived from naturally occurring trimeric proteins may be employed in preparing trimeric polypeptides of the invention.

[207] In another example, proteins of the invention are associated by interactions between Flag® polypeptide sequence contained in fusion proteins of the invention containing Flag® polypeptide sequence. In a further embodiment, proteins of the invention are associated by interactions between heterologous polypeptide sequence contained in Flag® fusion proteins of the invention and anti-Flag® antibody.

[208] The multimers of the invention may be generated using chemical techniques known in the art. For example, polypeptides desired to be contained in the multimers of the invention may be chemically cross-linked using linker molecules and linker molecule length optimization techniques known in the art (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety). Additionally, multimers of the invention may be generated using techniques known in the art to form one or more inter-molecule cross-links between the cysteine residues located within the sequence of the polypeptides desired to be contained in the multimer (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety). Further, polypeptides of the invention may be routinely modified by the addition of cysteine or biotin to the C-terminus or N-terminus of the polypeptide and techniques known in the art may be applied to generate multimers containing one or more of these modified polypeptides (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety). Additionally, techniques known in the art may be applied to generate liposomes containing the polypeptide components desired to be contained in the multimer of the invention (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety).

[209] Alternatively, multimers of the invention may be generated using genetic engineering techniques known in the art. In one embodiment, polypeptides contained in multimers of the invention are produced recombinantly using fusion protein technology described herein or otherwise known in the art (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety). In a specific embodiment, polynucleotides coding for a homodimer of the invention are generated by ligating a polynucleotide sequence encoding a polypeptide of the invention to a sequence encoding a linker polypeptide and then further to a synthetic polynucleotide encoding the translated product of the polypeptide in the reverse orientation from the original C-terminus to the N-terminus (lacking the leader sequence) (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety). In another embodiment, recombinant techniques described herein or otherwise known in the art are applied to generate recombinant polypeptides of the invention which contain a transmembrane domain (or hydrophobic or signal peptide) and which can be incorporated by membrane reconstitution techniques into liposomes (see, e.g., US Patent Number 5,478,925, which is herein incorporated by reference in its entirety).

Antibodies

[210] Further polypeptides of the invention relate to antibodies and T-cell antigen receptors (TCR) which immunospecifically bind a polypeptide, polypeptide fragment, or variant of the invention (e.g., a polypeptide or fragment or variant of the amino acid sequence of SEQ ID NO:Y or a polypeptide encoded by the cDNA contained in Clone ID No:Z, and/or an epitope, of the present invention) as determined by immunoassays well known in the art for assaying specific antibody-antigen binding. Antibodies of the invention include, but are not limited to, polyclonal, monoclonal, multispecific, human, humanized or chimeric antibodies, single chain antibodies, Fab fragments, F(ab') fragments, fragments produced by a Fab expression library, anti-idiotypic (anti-Id) antibodies (including, e.g., anti-Id antibodies to antibodies of the invention), intracellularly-made antibodies (i.e., intrabodies), and epitope-binding fragments of any of the above. The term "antibody," as used herein, refers to immunoglobulin molecules and immunologically active portions of immunoglobulin molecules, i.e., molecules that contain an antigen binding site that immunospecifically binds an antigen. The immunoglobulin molecules of the invention can be of any type (e.g., IgG, IgE, IgM, IgD, IgA and IgY), class (e.g., IgG1,

IgG2, IgG3, IgG4, IgA1 and IgA2) or subclass of immunoglobulin molecule. In preferred embodiments, the immunoglobulin molecules of the invention are IgG1. In other preferred embodiments, the immunoglobulin molecules of the invention are IgG4.

[211] Most preferably the antibodies are human antigen-binding antibody fragments of the present invention and include, but are not limited to, Fab, Fab' and F(ab')₂, Fd, single-chain Fvs (scFv), single-chain antibodies, disulfide-linked Fvs (sdFv) and fragments comprising either a VL or VH domain. Antigen-binding antibody fragments, including single-chain antibodies, may comprise the variable region(s) alone or in combination with the entirety or a portion of the following: hinge region, CH1, CH2, and CH3 domains. Also included in the invention are antigen-binding fragments also comprising any combination of variable region(s) with a hinge region, CH1, CH2, and CH3 domains. The antibodies of the invention may be from any animal origin including birds and mammals. Preferably, the antibodies are human, murine (e.g., mouse and rat), donkey, ship rabbit, goat, guinea pig, camel, horse, or chicken. As used herein, "human" antibodies include antibodies having the amino acid sequence of a human immunoglobulin and include antibodies isolated from human immunoglobulin libraries or from animals transgenic for one or more human immunoglobulin and that do not express endogenous immunoglobulins, as described infra and, for example in, U.S. Patent No. 5,939,598 by Kucherlapati et al.

[212] The antibodies of the present invention may be monospecific, bispecific, trispecific or of greater multispecificity. Multispecific antibodies may be specific for different epitopes of a polypeptide of the present invention or may be specific for both a polypeptide of the present invention as well as for a heterologous epitope, such as a heterologous polypeptide or solid support material. See, e.g., PCT publications WO 93/17715; WO 92/08802; WO 91/00360; WO 92/05793; Tutt, et al., J. Immunol. 147:60-69 (1991); U.S. Patent Nos. 4,474,893; 4,714,681; 4,925,648; 5,573,920; 5,601,819; Kostelny et al., J. Immunol. 148:1547-1553 (1992).

[213] Antibodies of the present invention may be described or specified in terms of the epitope(s) or portion(s) of a polypeptide of the present invention which they recognize or specifically bind. The epitope(s) or polypeptide portion(s) may be specified as described herein, e.g., by N-terminal and C-terminal positions, or by size in contiguous amino acid residues, or listed in the Tables and Figures. Preferred epitopes of the invention include the predicted epitopes shown in column 7 of Table 1A, as well as polynucleotides that encode

these epitopes. Antibodies which specifically bind any epitope or polypeptide of the present invention may also be excluded. Therefore, the present invention includes antibodies that specifically bind polypeptides of the present invention, and allows for the exclusion of the same.

[214] Antibodies of the present invention may also be described or specified in terms of their cross-reactivity. Antibodies that do not bind any other analog, ortholog, or homolog of a polypeptide of the present invention are included. Antibodies that bind polypeptides with at least 95%, at least 90%, at least 85%, at least 80%, at least 75%, at least 70%, at least 65%, at least 60%, at least 55%, and at least 50% identity (as calculated using methods known in the art and described herein) to a polypeptide of the present invention are also included in the present invention. In specific embodiments, antibodies of the present invention cross-react with murine, rat and/or rabbit homologs of human proteins and the corresponding epitopes thereof. Antibodies that do not bind polypeptides with less than 95%, less than 90%, less than 85%, less than 80%, less than 75%, less than 70%, less than 65%, less than 60%, less than 55%, and less than 50% identity (as calculated using methods known in the art and described herein) to a polypeptide of the present invention are also included in the present invention. In a specific embodiment, the above-described cross-reactivity is with respect to any single specific antigenic or immunogenic polypeptide, or combination(s) of 2, 3, 4, 5, or more of the specific antigenic and/or immunogenic polypeptides disclosed herein. Further included in the present invention are antibodies which bind polypeptides encoded by polynucleotides which hybridize to a polynucleotide of the present invention under stringent hybridization conditions (as described herein). Antibodies of the present invention may also be described or specified in terms of their binding affinity to a polypeptide of the invention. Preferred binding affinities include those with a dissociation constant or K_d less than 5×10^{-2} M, 10^{-2} M, 5×10^{-3} M, 10^{-3} M, 5×10^{-4} M, 10^{-4} M, 5×10^{-5} M, 10^{-5} M, 5×10^{-6} M, 10^{-6} M, 5×10^{-7} M, 10^{-7} M, 5×10^{-8} M, 10^{-8} M, 5×10^{-9} M, 10^{-9} M, 5×10^{-10} M, 10^{-10} M, 5×10^{-11} M, 10^{-11} M, 5×10^{-12} M, 10^{-12} M, 5×10^{-13} M, 10^{-13} M, 5×10^{-14} M, 10^{-14} M, 5×10^{-15} M, or 10^{-15} M.

[215] The invention also provides antibodies that competitively inhibit binding of an antibody to an epitope of the invention as determined by any method known in the art for determining competitive binding, for example, the immunoassays described herein. In preferred embodiments, the antibody competitively inhibits binding to the epitope by at

least 95%, at least 90%, at least 85 %, at least 80%, at least 75%, at least 70%, at least 60%, or at least 50%.

[216] Antibodies of the present invention may act as agonists or antagonists of the polypeptides of the present invention. For example, the present invention includes antibodies which disrupt the receptor/ligand interactions with the polypeptides of the invention either partially or fully. Preferably, antibodies of the present invention bind an antigenic epitope disclosed herein, or a portion thereof. The invention features both receptor-specific antibodies and ligand-specific antibodies. The invention also features receptor-specific antibodies which do not prevent ligand binding but prevent receptor activation. Receptor activation (i.e., signaling) may be determined by techniques described herein or otherwise known in the art. For example, receptor activation can be determined by detecting the phosphorylation (e.g., tyrosine or serine/threonine) of the receptor or its substrate by immunoprecipitation followed by western blot analysis (for example, as described *supra*). In specific embodiments, antibodies are provided that inhibit ligand activity or receptor activity by at least 95%, at least 90%, at least 85%, at least 80%, at least 75%, at least 70%, at least 60%, or at least 50% of the activity in absence of the antibody.

[217] The invention also features receptor-specific antibodies which both prevent ligand binding and receptor activation as well as antibodies that recognize the receptor-ligand complex, and, preferably, do not specifically recognize the unbound receptor or the unbound ligand. Likewise, included in the invention are neutralizing antibodies which bind the ligand and prevent binding of the ligand to the receptor, as well as antibodies which bind the ligand, thereby preventing receptor activation, but do not prevent the ligand from binding the receptor. Further included in the invention are antibodies which activate the receptor. These antibodies may act as receptor agonists, i.e., potentiate or activate either all or a subset of the biological activities of the ligand-mediated receptor activation, for example, by inducing dimerization of the receptor. The antibodies may be specified as agonists, antagonists or inverse agonists for biological activities comprising the specific biological activities of the peptides of the invention disclosed herein. The above antibody agonists can be made using methods known in the art. See, e.g., PCT publication WO 96/40281; U.S. Patent No. 5,811,097; Deng et al., *Blood* 92(6):1981-1988 (1998); Chen et al., *Cancer Res.* 58(16):3668-3678 (1998); Harrop et al., *J. Immunol.* 161(4):1786-1794 (1998); Zhu et al., *Cancer Res.* 58(15):3209-3214 (1998); Yoon et al., *J. Immunol.*

160(7):3170-3179 (1998); Prat et al., J. Cell. Sci. 111(Pt2):237-247 (1998); Pitard et al., J. Immunol. Methods 205(2):177-190 (1997); Liautard et al., Cytokine 9(4):233-241 (1997); Carlson et al., J. Biol. Chem. 272(17):11295-11301 (1997); Taryman et al., Neuron 14(4):755-762 (1995); Muller et al., Structure 6(9):1153-1167 (1998); Bartunek et al., Cytokine 8(1):14-20 (1996) (which are all incorporated by reference herein in their entireties).

[218] Antibodies of the present invention may be used, for example, to purify, detect, and target the polypeptides of the present invention, including both *in vitro* and *in vivo* diagnostic and therapeutic methods. For example, the antibodies have utility in immunoassays for qualitatively and quantitatively measuring levels of the polypeptides of the present invention in biological samples. See, e.g., Harlow et al., Antibodies: A Laboratory Manual, (Cold Spring Harbor Laboratory Press, 2nd ed. 1988); incorporated by reference herein in its entirety.

[219] As discussed in more detail below, the antibodies of the present invention may be used either alone or in combination with other compositions. The antibodies may further be recombinantly fused to a heterologous polypeptide at the N- or C-terminus or chemically conjugated (including covalent and non-covalent conjugations) to polypeptides or other compositions. For example, antibodies of the present invention may be recombinantly fused or conjugated to molecules useful as labels in detection assays and effector molecules such as heterologous polypeptides, drugs, radionuclides, or toxins. See, e.g., PCT publications WO 92/08495; WO 91/14438; WO 89/12624; U.S. Patent No. 5,314,995; and EP 396,387; the disclosures of which are incorporated herein by reference in their entireties.

[220] The antibodies of the invention include derivatives that are modified, i.e., by the covalent attachment of any type of molecule to the antibody such that covalent attachment does not prevent the antibody from generating an anti-idiotypic response. For example, but not by way of limitation, the antibody derivatives include antibodies that have been modified, e.g., by glycosylation, acetylation, pegylation, phosphorylation, amidation, derivatization by known protecting/blocking groups, proteolytic cleavage, linkage to a cellular ligand or other protein, etc. Any of numerous chemical modifications may be carried out by known techniques, including, but not limited to specific chemical cleavage, acetylation, formylation, metabolic synthesis of tunicamycin, etc. Additionally, the derivative may contain one or more non-classical amino acids.

[221] The antibodies of the present invention may be generated by any suitable method known in the art. Polyclonal antibodies to an antigen-of-interest can be produced by various procedures well known in the art. For example, a polypeptide of the invention can be administered to various host animals including, but not limited to, rabbits, mice, rats, etc. to induce the production of sera containing polyclonal antibodies specific for the antigen. Various adjuvants may be used to increase the immunological response, depending on the host species, and include but are not limited to, Freund's (complete and incomplete), mineral gels such as aluminum hydroxide, surface active substances such as lysolecithin, pluronic polyols, polyanions, peptides, oil emulsions, keyhole limpet hemocyanins, dinitrophenol, and potentially useful human adjuvants such as BCG (bacille Calmette-Guerin) and corynebacterium parvum. Such adjuvants are also well known in the art.

[222] Monoclonal antibodies can be prepared using a wide variety of techniques known in the art including the use of hybridoma, recombinant, and phage display technologies, or a combination thereof. For example, monoclonal antibodies can be produced using hybridoma techniques including those known in the art and taught, for example, in Harlow et al., *Antibodies: A Laboratory Manual*, (Cold Spring Harbor Laboratory Press, 2nd ed. 1988); Hammerling, et al., in: *Monoclonal Antibodies and T-Cell Hybridomas* 563-681 (Elsevier, N.Y., 1981) (said references incorporated by reference in their entireties). The term "monoclonal antibody" as used herein is not limited to antibodies produced through hybridoma technology. The term "monoclonal antibody" refers to an antibody that is derived from a single clone, including any eukaryotic, prokaryotic, or phage clone, and not the method by which it is produced.

[223] Methods for producing and screening for specific antibodies using hybridoma technology are routine and well known in the art and are discussed in detail in the Examples. In a non-limiting example, mice can be immunized with a polypeptide of the invention or a cell expressing such peptide. Once an immune response is detected, e.g., antibodies specific for the antigen are detected in the mouse serum, the mouse spleen is harvested and splenocytes isolated. The splenocytes are then fused by well known techniques to any suitable myeloma cells, for example cells from cell line SP20 available from the ATCC. Hybridomas are selected and cloned by limited dilution. The hybridoma clones are then assayed by methods known in the art for cells that secrete antibodies capable of binding a polypeptide of the invention. Ascites fluid, which generally contains

high levels of antibodies, can be generated by immunizing mice with positive hybridoma clones.

[224] Accordingly, the present invention provides methods of generating monoclonal antibodies as well as antibodies produced by the method comprising culturing a hybridoma cell secreting an antibody of the invention wherein, preferably, the hybridoma is generated by fusing splenocytes isolated from a mouse immunized with an antigen of the invention with myeloma cells and then screening the hybridomas resulting from the fusion for hybridoma clones that secrete an antibody able to bind a polypeptide of the invention.

[225] Another well known method for producing both polyclonal and monoclonal human B cell lines is transformation using Epstein Barr Virus (EBV). Protocols for generating EBV-transformed B cell lines are commonly known in the art, such as, for example, the protocol outlined in Chapter 7.22 of *Current Protocols in Immunology*, Coligan et al., Eds., 1994, John Wiley & Sons, NY, which is hereby incorporated in its entirety by reference. The source of B cells for transformation is commonly human peripheral blood, but B cells for transformation may also be derived from other sources including, but not limited to, lymph nodes, tonsil, spleen, tumor tissue, and infected tissues. Tissues are generally made into single cell suspensions prior to EBV transformation. Additionally, steps may be taken to either physically remove or inactivate T cells (e.g., by treatment with cyclosporin A) in B cell-containing samples, because T cells from individuals seropositive for anti-EBV antibodies can suppress B cell immortalization by EBV.

[226] In general, the sample containing human B cells is inoculated with EBV, and cultured for 3-4 weeks. A typical source of EBV is the culture supernatant of the B95-8 cell line (ATCC #VR-1492). Physical signs of EBV transformation can generally be seen towards the end of the 3-4 week culture period. By phase-contrast microscopy, transformed cells may appear large, clear, hairy and tend to aggregate in tight clusters of cells. Initially, EBV lines are generally polyclonal. However, over prolonged periods of cell cultures, EBV lines may become monoclonal or polyclonal as a result of the selective outgrowth of particular B cell clones. Alternatively, polyclonal EBV transformed lines may be subcloned (e.g., by limiting dilution culture) or fused with a suitable fusion partner and plated at limiting dilution to obtain monoclonal B cell lines. Suitable fusion partners for EBV transformed cell lines include mouse myeloma cell lines (e.g., SP2/0, X63-Ag8.653),

heteromyeloma cell lines (human x mouse; e.g., SPAM-8, SBC-H20, and CB-F7), and human cell lines (e.g., GM 1500, SKO-007, RPMI 8226, and KR-4). Thus, the present invention also provides a method of generating polyclonal or monoclonal human antibodies against polypeptides of the invention or fragments thereof, comprising EBV-transformation of human B cells.

[227] Antibody fragments which recognize specific epitopes may be generated by known techniques. For example, Fab and F(ab')₂ fragments of the invention may be produced by proteolytic cleavage of immunoglobulin molecules, using enzymes such as papain (to produce Fab fragments) or pepsin (to produce F(ab')₂ fragments). F(ab')₂ fragments contain the variable region, the light chain constant region and the CH1 domain of the heavy chain.

[228] For example, the antibodies of the present invention can also be generated using various phage display methods known in the art. In phage display methods, functional antibody domains are displayed on the surface of phage particles which carry the polynucleotide sequences encoding them. In a particular embodiment, such phage can be utilized to display antigen binding domains expressed from a repertoire or combinatorial antibody library (e.g., human or murine). Phage expressing an antigen binding domain that binds the antigen of interest can be selected or identified with antigen, e.g., using labeled antigen or antigen bound or captured to a solid surface or bead. Phage used in these methods are typically filamentous phage including fd and M13 binding domains expressed from phage with Fab, Fv or disulfide stabilized Fv antibody domains recombinantly fused to either the phage gene III or gene VIII protein. Examples of phage display methods that can be used to make the antibodies of the present invention include those disclosed in Brinkman et al., *J. Immunol. Methods* 182:41-50 (1995); Ames et al., *J. Immunol. Methods* 184:177-186 (1995); Kettleborough et al., *Eur. J. Immunol.* 24:952-958 (1994); Persic et al., *Gene* 187 9-18 (1997); Burton et al., *Advances in Immunology* 57:191-280 (1994); PCT application No. PCT/GB91/01134; PCT publications WO 90/02809; WO 91/10737; WO 92/01047; WO 92/18619; WO 93/11236; WO 95/15982; WO 95/20401; and U.S. Patent Nos. 5,698,426; 5,223,409; 5,403,484; 5,580,717; 5,427,908; 5,750,753; 5,821,047; 5,571,698; 5,427,908; 5,516,637; 5,780,225; 5,658,727; 5,733,743 and 5,969,108; each of which is incorporated herein by reference in its entirety.

[229] As described in the above references, after phage selection, the antibody coding regions from the phage can be isolated and used to generate whole antibodies, including human antibodies, or any other desired antigen binding fragment, and expressed in any desired host, including mammalian cells, insect cells, plant cells, yeast, and bacteria, e.g., as described in detail below. For example, techniques to recombinantly produce Fab, Fab' and F(ab')₂ fragments can also be employed using methods known in the art such as those disclosed in PCT publication WO 92/22324; Mullinax et al., *BioTechniques* 12(6):864-869 (1992); and Sawai et al., *AJRI* 34:26-34 (1995); and Better et al., *Science* 240:1041-1043 (1988) (said references incorporated by reference in their entireties).

[230] Examples of techniques which can be used to produce single-chain Fvs and antibodies include those described in U.S. Patents 4,946,778 and 5,258,498; Huston et al., *Methods in Enzymology* 203:46-88 (1991); Shu et al., *PNAS* 90:7995-7999 (1993); and Skerra et al., *Science* 240:1038-1040 (1988). For some uses, including *in vivo* use of antibodies in humans and *in vitro* detection assays, it may be preferable to use chimeric, humanized, or human antibodies. A chimeric antibody is a molecule in which different portions of the antibody are derived from different animal species, such as antibodies having a variable region derived from a murine monoclonal antibody and a human immunoglobulin constant region. Methods for producing chimeric antibodies are known in the art. See e.g., Morrison, *Science* 229:1202 (1985); Oi et al., *BioTechniques* 4:214 (1986); Gillies et al., (1989) *J. Immunol. Methods* 125:191-202; U.S. Patent Nos. 5,807,715; 4,816,567; and 4,816,397, which are incorporated herein by reference in their entirety. Humanized antibodies are antibody molecules from non-human species antibody that binds the desired antigen having one or more complementarity determining regions (CDRs) from the non-human species and a framework regions from a human immunoglobulin molecule. Often, framework residues in the human framework regions will be substituted with the corresponding residue from the CDR donor antibody to alter, preferably improve, antigen binding. These framework substitutions are identified by methods well known in the art, e.g., by modeling of the interactions of the CDR and framework residues to identify framework residues important for antigen binding and sequence comparison to identify unusual framework residues at particular positions. (See, e.g., Queen et al., U.S. Patent No. 5,585,089; Riechmann et al., *Nature* 332:323 (1988), which are incorporated herein by reference in their entireties.) Antibodies can be